

Brent L. Nielsen, Ph.D.

Professor
Brigham Young University
Dept. of Microbiology and Molecular Biology
Provo, UT 84602

3130 LSB
(801)422-1102
(801)885-5050 (cell)
brentnielsen@byu.edu

EDUCATION

<u>Name of Institution</u>	<u>Years</u>	<u>Major</u>	<u>Degree</u>
University of California, Irvine	1985-88	Molecular Biology	Post Doctoral
Oregon State University	1980-85	Microbiology	Ph.D.
Brigham Young University	1975-80	Microbiology	B.S.

PROFESSIONAL POSITIONS

<u>Institution</u>	<u>Dates</u>	<u>Position</u>
Brigham Young University	2000- Present	Professor
Sabbatical Leave, Univ. of Nebraska	June-Oct. 2014	Visiting Scientist
Brigham Young University	2005-2011	Dept. Chair
Auburn University	1999-2000	Professor
Auburn University	1993-1999	Associate Professor
Auburn University	1988-1993	Assistant Professor
University of California, Irvine	1985-1988	Postdoctoral Researcher

PROFESSIONAL ORGANIZATIONS AND HONOR SOCIETIES

American Society for Biochemistry and Molecular Biology (full member since 1991)
American Society for Microbiology
American Society of Plant Biologists
International Society for Plant Molecular Biology (until the society disbanded in 2006)
Sigma Xi Research Society (elected in 1989)
Phi Eta Sigma Scholastic Honor Society (inducted 1976)

HONORS AND AWARDS AND DATES RECEIVED

BYU College of Biology & Agriculture Professorship, BYU, 2005-2006.
Received BYU Office of Research and Creative Activity (ORCA) and College of Biology & Agriculture Mentoring Environment Grants, 2001-2003; 2005-2015.
Auburn Alumni/Sigma Xi Research Award recipient, 1998.
Summer Faculty Research Associate, U.S. Air Force Office of Scientific Research, Brooks Air Force Base, San Antonio, Texas, 1997.
Postdoctoral Training Fellowship from the Campus Biotechnology Training Program, University of California, Irvine, 1986-1988.
Annual Outstanding Graduate Student Publication Award, the Graduate School, Oregon State Univ., 1985.
Tartar Competitive Research Fellowship in Microbiology, Oregon State University, 1981 and 1983.
Outstanding undergraduate research award, Thermochemical Institute, Brigham Young University, 1980.

ACADEMIC SERVICE ACTIVITIES

Department	Member, Faculty Development Committee	2004-5, 2011, 2018-present
(at BYU)	Chair, MMBIO Dept. Faculty Development Committee	2012-2016
	Chair, Department of Microbiology & Molecular Biology	Sept. 2005-Aug. 2011
	Department Graduate Committee	2001-2004
	Graduate Coordinator	2002-2004
	Member, Dept. Executive Committee	2002-2004, 2012-2016
	Member, ad hoc committee to develop college core courses	2003
	Chair, Molecular Biology Seminar Committee	2001-2002
	Curriculum Reinvention Committee	2001-2002
(at Auburn University)		
	Undergraduate Program Officer and Dept. Executive Committee Member	2000
	Dept. of Botany & Microbiology Graduate Program Officer	1994-1999
	Member, Curriculum Committee	1996-2000
College	College Rank & Status Committee member	2019-present
(at BYU)	MEG research review committee	2011-2014
	College Leadership Council member	2005-2011
	College Graduate Council	2002-2004
	Premedical Committee	2001-2003
	Molecular Biology Committee member and director	2000-2003
(at Auburn)	COSAM Committee to Review the Biological Sciences, and Task Force for the biological sciences department merger	1998-1999
University	University Rank & Status Committee, (co-chair, 2018)	2015-2018
(at BYU)	Rank & Status Appeals Examining Committee	2013-2015
	Co-chair, Search committee for College of Life Sciences Dean	2014-2015
(at Auburn)	University Institutional Biosafety Committee Member and Chair	1998-2000
	Founding Executive Committee Member, AU Cellular and Molecular Biology Program	1999-2000
	Auburn University Graduate Council, member	1996-1999

PROFESSIONAL AND COMMUNITY SERVICE ACTIVITIES

State, Regional, National, and International

Associate Editor, Plants (MDPI publisher)	2018-present
Associate Editor, Emirates Journal of Food & Agriculture	2014-present
Member, Study Section on Prokaryotic Cell & Molecular Biology	
NIH grant review panel, 3 meetings	2018-2019
Judge, Sterling Scholars of Utah, Science category finals (annual)	2018-present
Judge, Science Fair, Arches Academy	2018-2020
Guest Associate Editor for special issue on Advances in Plastid Biotechnology for Frontiers in Plant Science	2015-2016
NIH Minority Biomedical Research Support Program review panel member, Bethesda MD	2003 & 2007

Ad hoc reviewer, Alabama Agricultural Experiment Station Competitive Grant Program 2003

NIH Special Emphasis review panel member, Bethesda MD 2000

Visiting Scientist, Federation of American Societies for Experimental Biology (FASEB) Minority Institutions Program 1993, 1994, 1997

State of Texas Higher Education Coordinating Board Biological Sciences competitive grant review panel, Austin TX 1997

USDA/NRICGP Plant Genetic Mechanisms review panel member 1996

Ad hoc reviewer for two new molecular biology texts, Prentice Hall Publishers and McGraw/Hill 1998

Ad hoc reviewer for several journals and federal funding agencies (15-18 per year; USDA, NSF, U.S. Dept. of Education, MRC/Canada) 1992-present

Community/outreach

Judge, Sterling Scholars of Utah, Science category finals 2018-2020

Judge, undergraduate research poster competition at annual meeting of the American Society for Biochemistry & Molecular Biology 2005, 2006, 2008, 2010, 2012

Judge, student oral presentation competitions at branch meeting of the American Society for Microbiology and American Society of Plant Biologists 2006, 2009, 2008

Judge, Utah Conference on Undergraduate Research 2008

Judge, Sterling Scholars of Central Utah, Science category 2010, 2011, 2013

TEACHING

at BYU:

Molecular Biology, MMBIO 240, 3 credits, required for several majors in the College of Life Sciences and others, including pre-medical and pre-dental students

History & Philosophy of MMBIO, MMBIO 510 (previously 513), 2 credits, graduate/advanced undergraduate course

MMBIO 512 Gene Expression (previously RNA-Mediated Regulation of Gene Expression, MMBIO 615/515), 2 credits, graduate/advanced undergraduate course

Advanced Molecular Biology, MMBIO 441, 3 credits, required for molecular biology majors

Molecular Biology Laboratory, MMBIO 442, 2 credits, required for molecular biology majors

Advanced Cell Biology, MMBIO 430, 3 credits, elective for MMBIO and PDBIO majors (taught once)

History of Microbiology, MCBIO 481, 1 credit hour, formerly required for microbiology majors

Department Seminar, MMBIO 490R and 695R, 1 credit, required for molecular biology majors and graduate students

Current Topics in Molecular Biology, MMBIO 390R, 1 credit, required for molecular biology majors

Principles of Eukaryotic Gene Expression, MMBIO 603, 3 credits, course for new graduate students

Science of Biology, PDBIO 120, 2 credits, required for many majors in our college and other colleges

Mentored Undergraduate Research, MMBIO 494R, variable credit, required for molecular biology majors and elective for many others

Undergraduate research students mentoring

I have typically mentored 8-10 undergraduate students in my research laboratory each year. Several students have attended the annual meeting of the American Society for Biochemistry and Molecular Biology and regional or national meetings of the American Society of Plant Biologists and the American Society for Microbiology, and competed in the undergraduate poster competition. Several students have received awards for their poster presentations at these meetings. Some have been coauthors on peer-reviewed publications, including as first author on some papers. Several of these students have gone on to medical or professional school, including one who completed the MD/PhD program at the Univ. of Pennsylvania and others at many graduate schools in molecular biology at top graduate, medical and dental schools in the U.S. and Europe.

Graduate student committees (since 2000 while at BYU)

<u>Name</u>	<u>Department</u>	<u>Degree Program (year completed)</u>	<u>Member/Chair</u>
Miller, Ashley	Microbiology & Molecular Biology	M.S.	Chair
Zhao, Emily	Chemical Engineering	Ph.D.	Member
Bates, David	Microbiology & Molecular Biology	Ph.D.	Member
Benedict, Alex	Microbiology & Molecular Biology	Ph.D.	Member
Hoj, Taalin	Microbiology & Molecular Biology	Ph.D.	Member
Morley, Stewart	Microbiology & Molecular Biology	Ph.D. (2019)	Chair
Dallon, Emma	Microbiology & Molecular Biology	M.S. (2018)	Member
Kempton, Colton	Microbiology & Molecular Biology	Ph.D. (2017)	Member
Schinn, Matt	Chemical Engineering	Ph.D. (2017)	Member
Diray-Arce, Joann	Microbiology & Molecular Biology	Ph.D. (2016)	Chair
Cupp, John	Microbiology & Molecular Biology	Ph.D. (2012)	Chair
Gunnell, Mark	Microbiology & Molecular Biology	Ph.D. (2015)	Member
Gardner, Stewart	Microbiology & Molecular Biology	Ph.D. (2014)	Member
Crook, Matt	Microbiology & Molecular Biology	Ph.D. (2013)	Member
Gustafsson, Marcus	Microbiology & Molecular Biology	M.S. (2012)	Member
Brammer, Jeff	Microbiology & Molecular Biology	M.S. (2010)	Chair
Song, Daqing	Microbiology & Molecular Biology	M.S. (2005)	Chair
Mayo, Jaime	Microbiology & Molecular Biology	Ph.D. (2007)	Member
Egan, Ashley	Microbiology & Molecular Biology	Ph.D. (2006)	Member
Dudleenamjil, Enkhmart	Micro. & Mol. Biology	Ph.D. (2009)	Member
Porter, Heidi	Microbiology & Molecular Biology	Ph.D. (2008)	Member
Tinah, Enass	Microbiology & Molecular Biology	M.S. (2007)	Member
Clifford, Adrienne	Microbiology & Molecular Biology	M.S. (2006)	Member
Balzotti, Marie	Plant & Animal Science	M.S. (2006)	Member
King, Summer	Physiology & Developmental Biology	M.S. (2007)	Member
Turner, Taylor	Plant & Animal Science	M.S.(2007)	Member
Pickett, David	Microbiology & Molecular Biology	M.S. (2005)	Member

Gardner, Stewart	Microbiology & Molecular Biology	M.S. (2005)	Member
Ohmine, Seiga	Microbiology & Molecular Biology	M.S. (2005)	Member
Lassen, Matt	Microbiology & Molecular Biology	M.S. (2004)	Chair
Spencer, Jeff	Microbiology & Molecular Biology	M.S. (2004)	Member
Crowley, Jared	Zoology	M.S. (2004)	Member
Buckwalter, Matt	Microbiology	M.S. (2003)	Member
Millar, Camilla	Microbiology	M.S. (2003)	Member
Revelli, David	Microbiology	M.S. (2003)	Member
Tomer, David	Microbiology	M.S. (2003)	Member
Masannat, Iyas	Molecular Biology	M.S. (2002)	Member
Khazi, Fayaz	Biological Sciences (Auburn Univ.)	Ph.D. (2002)	Chair

Postdoctoral and visiting scientists directed since 2010. I have directed 4 postdoctoral fellows in the past 26 years.

<u>Name</u>	<u>Funding Source</u>	<u>Years</u>	<u>Current Position</u>
Bilquees Gul	NIH grant/U.S. Dept. of State	2007; 2011-12	Professor
Visiting Faculty at BYU			Univ. of Karachi, Pakistan

PEER REVIEWED PUBLICATIONS (reverse chronological order)

Books and book chapters:

6. Nielsen BL and N Ahmad (e-book coeditors) Plant Organelle DNA Maintenance. 2020. Plants (MDPI). 142 pages.
5. Ahmad N, Burgess SJ, Nielsen BL (e-book coeditors) Advances in Plastid Biology and its Applications. 2016. Frontiers in Plant Science. 161 pages.
4. Diray-Arce, J., Gul, B., M.A. Khan and B.L. Nielsen. 2015. Halophyte Transcriptomics: Understanding Mechanisms of Salinity Tolerance, in Proceedings of the International Conference on Halophytes for Food Security in Dry Lands (invited chapter doi 10.1016/B978-0-12-801854-5.00010-8, Elsevier).
3. Nielsen B. 2008. Student Study Guide to Accompany Genes IX. Cathleen Sether, editor. Jones and Bartlett Publishers, Sudbury, Massachusetts, 194 p.
2. Nielsen, B., R. Grebenok and S. Kilpatrick. 2006. Test Item File for Essential Genes (Lewin). Pearson Prentice Hall Publishers, Upper Saddle River, New Jersey, 212 pages.
1. Cherry, J.H. and B.L. Nielsen. 2004. Metabolic Engineering of Chloroplasts for Abiotic Stress Tolerance, in Molecular Biology & Biotechnology of Plant Organelles, Eds. H. Daniell and C.D. Chase. Ch. 18, pps. 483-496, Kluwer Academic Press, Berlin.

Publications in peer reviewed scholarly journals:

- * designates undergraduate student coauthor; ^ designates graduate student coauthor:
66. Ahmad N, Nielsen BL. 2021. Plastid transcriptomics: an important tool for plastid functional genomics. Protein & Peptide Letters (in press, accepted Nov. 2020).
 65. Tseng HH, Huang WR, Cheng CY, Chiu HC, Liao TL, Nielsen BL, Liu HJ. 2020 (in press) Aspirin and 5- aminoimidazole-4- carboxamide riboside attenuate bovine ephemeral 1 fever virus replication by inhibiting BEFV-induced autophagy. Frontiers in Immunology 11:556838, 14 pages doi: 10.3389/fimmu.2020.556838

64. Ahmad N, Nielsen BL. 2020. Plant organelle DNA maintenance. *Plants*. 9:683, 5 pages. [doi:10.3390/plants9060683](https://doi.org/10.3390/plants9060683)
63. Chen YY, Yang WC, Chang YK, Wang CY, Huang WR, Li JY, Chuang KP, Wu HY, Chang CD, Nielsen BL, Liu HJ. 2020. Construction of polycistronic baculovirus surface display vectors to express the PCV2 Cap(d41) protein and analysis of its immunogenicity in mice and swine. *Veterinary Res* 51:112, 16 pages doi: 10.1186/s13567-020-00836-3
62. Tung M, Lu H, Chang Y, Huang W, Liao T, Wu H, Chang C, Fan H, Nielsen BL, Liu H. 2020. Baculovirus surface display of the HA protein of H5N2 avian influenza virus and its immunogenicity against a lethal challenge with H5N1 virus in chickens. *Veterinary Microbiology*. 243:10 pages. [doi:10.1016/j.vetmic.2020.108640](https://doi.org/10.1016/j.vetmic.2020.108640)
61. Shah SZ, Rasheed A, Gul B, Khan MA, Nielsen BL, Hameed A. 2020. Maternal salinity improves yield, size and stress tolerance of *Suaeda fruticosa* seeds. *Journal of Arid Land*. 2020. [doi:10.1007/s40333-020-0054-1](https://doi.org/10.1007/s40333-020-0054-1)
60. Asrar, H., T. Hussain, M. Qarim, B.L. Nielsen, B. Gul, M.A. Khan. 2020. Salt-induced modulations in antioxidative defense system of *Desmostachya bipinnata*. *Plant Physiology & Biochemistry*. 147:113-124. doi:10.1016/j.plaphy.2019.12.012
59. Morley, S.A., A. Peralta-Castro, L.G. Brieba, J. Miller, K.L. Ong, P.G. Ridge, A. Oliphant, S. Aldous, B.L. Nielsen. 2019. *Arabidopsis thaliana* organelles mimic the T7 phage DNA replisome with specific interactions between Twinkle protein and DNA polymerases Pol1A and Pol1B. *BMC Plant Biology* 19:241 (16 pages) doi:10.1186/s12870-019-1854-3
58. Shoukat, E., Z. Abideen, M.Z. Ahmed, M.Z., S. Gulzar, B.L. Nielsen. 2019. Changes in growth and photosynthesis linked with intensity and duration of salinity in *Phragmites karka*: A giant grass. *Environmental and Experimental Botany* 162:504-514.
57. Kearl, J., C. McNary, J.S. Lowman, C. Mei, Z. Aanderud, S.T. Smith, J. West, E. Colton, M. Hamson, B.L. Nielsen. 2019. Salt-tolerant halophyte rhizosphere bacteria stimulate growth of alfalfa in salty soils. *Frontiers in Microbiology* 10:1849 (11 pages) [doi:10.3389/fmicb.2019.01849](https://doi.org/10.3389/fmicb.2019.01849)
56. Diray-Arce, J., A. Knowles, A. Suvorov, J. O'Brien, C. Hansen, S.M. Bybee, B. Gul, M.A. Khan, B.L. Nielsen. 2019. Identification and evolutionary characterization of salt-responsive transcription factors in the succulent halophyte *Suaeda fruticosa*. *PLOS One*. 14:9 (20 pages). [doi:10.1371/journal.pone.0222940](https://doi.org/10.1371/journal.pone.0222940)
55. Morley, S.A., N. Ahmad, B.L. Nielsen. 2019. Plant Organelle Genome Replication. *Plants* 8:358 (18 pages). [doi:10.3390/plants8100358](https://doi.org/10.3390/plants8100358)
54. Chiu, H., W. Huang, Y. Wang, J. Li, T. Liao, B.L. Nielsen, H. Liu. 2019. Heterogeneous nuclear ribonucleoprotein A1 and lamin A/C modulate nucleoplasmic shuttling of avian reovirus p17. *Journal of Virology*. 93:20 (20 pages). [doi:10.1128/JVI.00851-19](https://doi.org/10.1128/JVI.00851-19)
53. Cheng, C., H. Tseng, H. Chiu, C. Chang, B.L. Nielsen, H. Liu. 2019. Bovine ephemeral fever virus triggers autophagy enhancing virus replication via upregulation of the Src/JNK/AP1 and PI3K/Akt/NF- κ B pathways and suppression of the PI3K/Akt/mTOR pathway. *Veterinary Research*. 50:79 (15 pages). [doi:10.1186/s13567-019-0697-0](https://doi.org/10.1186/s13567-019-0697-0)

52. Asrar, H., T. Hussain, B. Gul, M.A. Khan, B.L. Nielsen. 2018. Differential protein expression reveals salt tolerance mechanism of *Desmostachya bipinnata* at moderate and high levels of salinity. *Functional Plant Biology* 45:793-812.
51. Weber, K.S., L.C. Bridgewater, J.L. Jensen, D.P. Breakwell, B.L. Nielsen, S.M. Johnson. 2018. Personal microbiome analysis improves student engagement and interest in Immunology, Molecular Biology, and Genomics undergraduate courses. *PLoS ONE* 13(4): e0193696.
50. Chi, P.I., W.R. Huang, H.C. Chiu, J.Y. Li, B.L. Nielsen, H.J. Liu. 2018. Avian reovirus σ A-modulated suppression of lactate dehydrogenase and upregulation of glutaminolysis and the mTORC1/eIF4E/HIF-1 α pathway to enhance glycolysis and the TCA cycle for virus replication. *Cell Microbiol.* Aug 29:e12946, doi:10.1111/cml. 12946.
49. Chiu, H.C., W.R. Huang, T.L. Liao, P.I. Chi, B.L. Nielsen, J.H. Liu, H.J. Liu. 2018. Mechanistic insights into avian reovirus p17-modulated suppression of cell-cycle CDK cyclin complexes and enhancement of p53 and cyclin H interaction. *J. Biol. Chem.* 293:12542-12562.
48. Asrar, H., T. Hussain, S.M.S. Hadi, B. Gul, B. L. Nielsen, M.A. Khan. 2017. Salinity induced changes in light harvesting and carbon assimilating complexes of *Desmostachya bipinnata* (L.) Staph. *Environ. Exp. Botany* 135: 86-95.
47. Salehi, A.S.M.^, M.T. Smith, S.M. Schinn^, J.M. Hunt, C. Muhlestein^, J. Diray-Arce^, B. L. Nielsen, B.C. Bundy 2017. Efficient tRNA degradation and quantification in *Escherichia coli* cell extract using RNase-coated magnetic beads: a key step toward codon emancipation. *Biotechnol. Prog.* 33:1401-1407.
46. Huang, W.R., P.I. Chi, H.C. Chiu, J.L. Hsu, B.L. Nielsen, T.L. Liao, H.J. Liu. 2017. Avian reovirus p17 and σ A act cooperatively to downregulate Akt by suppressing mTORC2 and CDK2/cyclin A2 and upregulating proteasome PSMB6. *Scientific Reports* 7:5226. doi: 10.1038/s41598-017-05510-x.
45. Morley, S.A.^, B.L. Nielsen. 2016. Plant mitochondrial DNA. *Frontiers in Bioscience* 22:1023-1032.
44. Nielsen, B., N. Ahmad, S.J. Burgess. 2016. Advances in plastid biology and its applications. *Frontiers in Plant Science* doi: 10.3389/fpls.2016.01396.
43. Adnan, M.Y., T. Hussain, H. Asrar, A. Hameed, B. Gul, B. Nielsen, M.A. Khan. 2016. *Desmostachya bipinnata* manages photosynthesis and oxidative stress at moderate salinity. *Flora* 225:1-9.
42. Morley, S.A.^, B.L. Nielsen. 2016. Chloroplast DNA copy number changes during plant development in organelle DNA polymerase mutants. *Frontiers in Plant Science* 7:57
41. Larson, M.J., P.A. Clayson, C.M. Keith, I.J. Hunt, D. Hedges, B.L. Nielsen, V.R.A. Call. 2016. Cognitive control adjustments in healthy older and younger adults: conflict adaptation, the error-related negativity (ERN), and evidence of generalized decline with age. *Biological Psychology* 115:50-63.
40. Perry, C.E.^, S.D. Gale, L.D. Erickson, E. Wilson, B.L. Nielsen, J.S.K. Kauwe, D. Hedges. 2016. Seroprevalence and serointensity of latent *Toxoplasma gondii* in a sample of elderly adults with and without Alzheimer Disease. *Alzheimer Disease & Associated Disorders* 30:123-126.
39. Diray-Arce, J.^, M.J. Clement, B. Gul, M.A. Khan, B.L. Nielsen. 2015. Transcriptome Assembly, Profiling and Differential Gene Expression Analysis of the

- Halophyte *Suaeda fruticosa* Provides Insights into Salt Tolerance. BMC Genomics 16:353 (24 pages). Designated 'highly accessed' by BioMed Central.
38. Cupp, J.D.,[^] B.L. Nielsen. 2014. Minireview: DNA replication in plant mitochondria. *Mitochondrion* 19:231-237.
37. Gul, B., R. Ansari, H., M. Yousuf Adnan, D.J. Weber, B.L. Nielsen, H.-W. Koyro, M. A. Khan. 2014. The sustainable utilization of saline resources for livestock feed production in arid and semi-arid regions: A model from Pakistan. *Emirates Journal of Food and Agriculture* 26:1032-1045.
36. Cupp, J.D.,[^] B.L. Nielsen. 2013. *Arabidopsis thaliana* organellar DNA polymerase IB mutants exhibit reduced mtDNA levels with a decrease in mitochondrial area density. *Physiologia Plantarum*. 149:91-103.
35. Diray-Arce, J.[^], B. Liu[^], J.D. Cupp[^], T. Hunt*, B.L. Nielsen. 2013. The *Arabidopsis* At1g30680 gene encodes a homologue to the phage T7 gp4 protein that has both DNA primase and DNA helicase activities. *BMC Plant Biology* 13:36.
34. Lassen, M.G.,[^] S. Kochhar, B.L. Nielsen. 2011. Identification of a soybean chloroplast DNA replication origin-binding protein. *Plant Molecular Biology* 76:463-471.
33. Nielsen, B.L., J.D. Cupp,[^] J. Brammer.[^] 2010. Mechanisms for maintenance, replication, and repair of the chloroplast genome in plants. *J. Exp. Botany* 61:2535-2537.
32. Khan, M.A., R. Ansari, H. Ali, B. Gul, B.L. Nielsen. 2009. *Panicum turgidum*, a potentially sustainable cattle feed alternative to maize for saline areas. *Agriculture, Ecosystems and Environment* 129:542-546.
31. Manchekar, M.,[^] K. Scissum-Gunn,[^] L.A. Hammett,[^] S. Backert, B.L. Nielsen. 2009. Mitochondrial DNA recombination in *Brassica campestris*. *Plant Sci.* 177:629-635.
30. Nielsen, B.L., V.C. Willis* and C.Y. Lin. 2007. Western blot analysis to illustrate relative control levels of the *lac* and *ara* promoters in *E. coli*. *Biochemistry and Molecular Biology Education*, 35:133-137.
29. Manchekar, M.,[^] K. Scissum-Gunn,[^] D. Song,[^] F. Khazi,[^] S.L. McLean[^] and B.L. Nielsen. 2006. DNA recombination activity in soybean mitochondria. *J. Mol. Biol.*,356:288-299.
28. Edmondson, A.C.* , D. Song[^], L. A. Alvarez* M.K. Wall, D. Almond*, D.A. McClellan, A. Maxwell and B.L. Nielsen. 2005. Characterization of an *Arabidopsis thaliana* mitochondrial-targeted single-stranded DNA binding protein. *Molecular Genetics and Genomics*, 273:115-122.
27. Lugo, S.,[^] M. Kunnimalaiyaan, N.K. Singh and B.L. Nielsen. 2004. Required sequence elements for chloroplast DNA replication activity *in vitro* and in electroporated chloroplasts. *Plant Science* 166:151-161.
26. Khazi, F.R.[^], A.C. Edmondson* and B.L. Nielsen. 2003. An *Arabidopsis* homologue of bacterial RecA that complements an *E. coli* *recA* deletion is targeted to plant mitochondria. *Mol. Gen. Genet.* 269:454-463.
25. Nielsen, B.L. and Echols, S.* 2002. Use of a chloroplast rRNA gene to introduce basic molecular biology techniques. *Biochemistry and Molecular Biology Education* 30: 408-413.
24. Yang, W.,[^] D.B. Weaver, B.L. Nielsen and J. Qiu. 2001. Molecular mapping of a new gene for resistance to frog-eye leaf spot of soybean in "Peking." *Plant Breeding* 120:73-78.
23. Yang, W.,[^] D.B. Weaver, B.L. Nielsen and J. Qiu. 2000. A preliminary genetic linkage

- map of soybean using an intraspecific cross of two cultivars: Peking and Lee. Soybean Genetics Newsletter 27 (online journal-URL: <http://www.soygenetics.org/articles/sgn2000-019.htm>).
22. Backert, S., M. Kunnimalaiyaan, T. Börner and B.L. Nielsen. 1998. *In vitro* replication of mitochondrial plasmid mp1 from the higher plant *Chenopodium album* (L.): A remnant of bacterial rolling circle and conjugative plasmids? J. Mol. Biol. 284:1005-1015.
 21. Hammett, L.A.* and B.L. Nielsen. 1998. DNA sequence (Accession No. AF076166) of the *Brassica campestris* mitochondrial *atpA* gene (PGR 98-186). Plant Physiol. 118:1102.
 20. Scissum-Gunn, K.D.,* M. Gandhi,* S. Backert and B.L. Nielsen. 1998. Separation of different conformations of plant mitochondrial DNA molecules by field inversion gel electrophoresis. Plant Mol. Biol. Reporter 16:219-229.
 19. Kunnimalaiyaan, M. and B.L. Nielsen. 1997. Fine mapping of replication origins (*oriA* and *oriB*) in *Nicotiana tabacum* chloroplast DNA. Nucl. Acids Res. 25:3681-3686.
 18. Kunnimalaiyaan, M, F. Shi* and B.L. Nielsen. 1997. Analysis of a tobacco chloroplast DNA replication origin (*oriB*) downstream of the 23S rRNA gene. J. Mol. Biol. 268:273-283.
 17. Kunnimalaiyaan, M. and B.L. Nielsen. 1997. Chloroplast DNA replication: mechanism, enzymes and replication origins. J. Plant Biochem. Biotechnol. 6:1-7.
 16. Backert, S., B.L. Nielsen and T. Borner. 1997. The mystery of the rings: structure and replication of mitochondrial genomes from higher plants. Trends Plant Sci. 2:477-483.
 15. Zheng, D. B.L. Nielsen and H. Daniell. 1997. A 7.5 kbp region of the maize (T cytoplasm) mitochondrial genome contains a chloroplast-like *trnI* (CAT) pseudo gene and many short segments homologous to chloroplast and other known genes. Curr. Genet. 32:125-131.
 14. Liu, H.J.* , J.J. Giambrone and B.L. Nielsen. 1997. Molecular characterization of avian reoviruses using nested PCR and nucleotide sequence analysis. J. Virol. Meth. 65:159-167.
 13. Lu, Z.* , M. Kunnimalaiyaan and B.L. Nielsen. 1996. Characterization of replication origins flanking the 23S rRNA gene in tobacco chloroplast DNA. Plant Mol. Biol. 32:693-706.
 12. Locy, R.D., C.C. Chang* , B.L. Nielsen and N.K. Singh. 1996. Photosynthesis in salt-adapted heterotrophic tobacco cells and regenerated plants. Plant Physiol. 110:321-328.
 11. Daniell, H., D. Zheng and B.L. Nielsen. 1995. Isolation and characterization of an *in vitro* DNA replication system from maize mitochondria. Biochem. Biophys. Res. Comm. 208:287-294.
 10. Lu, Z.* , M. Templer^ and B.L. Nielsen. 1994. Rapid method for recovery of DNA from agarose gels. Biotechniques 16:400-402.
 9. Nielsen, B.L., Z. Lu* and K.K. Tewari. 1993. Characterization of the pea chloroplast DNA *oriA* region. Plasmid 30:197-211.
 8. Nielsen, B.L., V.K. Rajasekhar and K.K. Tewari. 1991. Pea chloroplast DNA primase: Characterization and involvement in replication initiation. Plant Mol. Biol. 16:1019-1034.
 7. Daniell, H., J. Vivekananda, B.L. Nielsen, G.N. Ye, K.K. Tewari and J.C. Sanford. 1990. Transient foreign gene expression in chloroplasts of cultured tobacco cells after

- biolistic delivery of chloroplast vectors. Proc. Natl. Acad. Sci. USA 87:88-92.
6. Meeker, R., B. Nielsen and K. Tewari. 1988. Localization of replication origins in pea chloroplast DNA. Mol. Cell. Biol. 8:1216-1223.
 5. Nielsen, B.L. and K.K. Tewari. 1988. Pea chloroplast topoisomerase I: Purification, characterization, and role in replication. Plant Mol. Biol. 11:3-14.
 4. Nielsen, B.L. and L.R. Brown. 1985. Purification and subunit characterization of the RNA polymerase of *Rhizobium meliloti*. J. Bacteriol. 162:645-650.
 3. Nielsen, B.L. and L.R. Brown. 1984. A basis for color formation of proteins in polyacrylamide gels by silver staining. Analytical Biochemistry 141:311-315.
 2. Izatt, R.M.; Nielsen, B.L.; Christensen, J.J.; Lamb, J.D. 1981. Membrane Transport of Ammonium and Alkylammonium Cations Using Macrocyclic Carriers. Journal of Membrane Science. 9: 263-271.
 1. Lamb, J.D.; Christensen, J.J.; Oscarson, J.L.; Nielsen, B.L.; Asay, B.W.; Izatt, R.M. 1980. The Relationship between Complex Stability Constants and Rates of Cation Transport through Liquid Membranes by Macrocyclic Carriers. J. Am. Chem. Soc. 102: 6820-6824.

SCHOLARLY PRESENTATIONS AND ABSTRACTS (SELECTED SINCE 2006)

- Miller, A., A. Knowles and B.L. Nielsen. 2020. Halophile inoculation significantly improves growth of alfalfa under saline conditions. Online poster due to Covid, annual meeting of the American Society for Biochemistry & Molecular Biology.
- Miller, A., A. Knowles, J. Hill, B. Pickett and B.L. Nielsen. 2020. Gene expression changes in plants inoculated with halophilic bacteria and grown in salty soil. Poster (online), Intermountain Branch meeting of the American Society for Microbiology.
- Quirante, J., C. Porter, T. Quirante and B. L. Nielsen. 2020. Siderophore and biofilm properties of halophilic bacterial strains that may contribute to growth promotion of inoculated plants in salty soil. Poster (online), Intermountain Branch meeting of the American Society for Microbiology (award for best poster in the session).
- Knowles, A. and B.L. Nielsen. 2019. Analysis of differential gene expression in Halomonas-inoculated alfalfa grown in the presence of salt. Poster, Intermountain Branch meeting of the American Society for Microbiology, Provo, Utah.
- Porter, C., M. Westdyke, E. Song and B.L. Nielsen. 2019. Characterization of salt-tolerant bacteria isolated from three halophytes that exhibit growth promotion capabilities with alfalfa grown under saline conditions. Poster, Intermountain Branch meeting of the American Society for Microbiology, Provo, Utah.
- Morley, S.A., B.L. Nielsen. 2019. Ancient enemies working together: how plant organelles reconciled phage and bacterial systems to replicate DNA. International Plant & Animal Genomes (PAG XXVII), San Diego.
- Nielsen, B.L., J. Kearl*, C. McNary*, S. Lowman, C. Mei, M. Hamson* and E. Colton*. 2019. Bacterial isolates from the halophilic microbiome of three halophytes with potential as inoculants for stimulation of crop growth under saline conditions. International Plant & Animal Genomes (PAG XXVII), San Diego.
- Nielsen, B.L., J. Kearl*, J. West*, C. McNary*, M. Hamson* and E. Colton*. 2018. Selected isolates from the halophilic microbiome of Utah halophytes have potential for stimulation of alfalfa growth in salty soil. PGPR (Plant Growth Promoting Rhizobacteria) Workshop, Victoria, Canada (poster and short talk).

- Morley, S.A., S. Aldous, A. Oliphant, B.L. Nielsen. 2018. Twinkle-DNA polymerase interactions and their role in plant mitochondrial DNA replication. Talk, Tri-Branch meeting of the American Society for Microbiology, Durango, Colorado (First place graduate student presentation).
- Hamson, M., E. Colton, J. Kearl, J. West, C. McNary and B.L. Nielsen. 2018. The halophilic microbiome of Utah halophytes can stimulate alfalfa growth in salty soil. Poster, Tri-Branch meeting of the American Society for Microbiology, Durango, CO.
- Oliphant, A., S. Aldous, S. Morley and B.L. Nielsen. 2018. The role of the Twinkle DNA primase/helicase in the plant mitochondrial DNA replisome. Poster, Tri-Branch meeting of the American Society for Microbiology, Durango, Colorado (People's Choice Award).
- Nielsen, B.L. 2017. The microbiome of native Utah halophytes: two isolates stimulate growth of a salt-sensitive crop plant. STEM seminar program, Alabama State University, Montgomery, Alabama.
- Morley, S. and B.L. Nielsen. 2017. Assembling the Arabidopsis mitochondrial DNA replisome. International Conference on Arabidopsis Research. St. Louis, Missouri.
- Kearl, J.*, C. McNary* and B.L. Nielsen. 2017. The microbiome of Utah halophytes. Life Sciences Undergraduate Research Poster Competition, BYU, Provo, Utah (received third place) and Intermountain Branch meeting, American Society of Microbiology, Weber State University, Utah.
- Nielsen, B.L., T. Augenstein*, K. Moore*, J. Arce and S.A. Morley. 2016. The Arabidopsis Single Stranded DNA Binding Protein SSB1 May Regulate Mitochondrial and Chloroplast DNA Replication. Mitochondria and Chloroplasts. Mt. Snow, Vermont.
- Morley, S.A. and B.L. Nielsen. 2016. Ancestry, Redundancy and Function of Arabidopsis PolIA and PolIB. LDS Life Sciences Symposium. Thanksgiving Point, Utah.
- Morley, S.A., J. Arce and B.L. Nielsen. 2016. Role of Organelle DNA Polymerases in Mitochondrial and Chloroplast DNA Replication in Arabidopsis thaliana. Western Section Meeting-American Society of Plant Biologists. BYU, Provo, Utah.
- Augenstein, T., J. Arce and B.L. Nielsen. 2016. The Role of a Single Stranded Binding Protein in Plant Mitochondrial and Chloroplast DNA Replication. Western Section Meeting-American Society of Plant Biologists. Brigham Young University, Provo, Utah.
- Herdegen, S., S.A. Morley and B.L. Nielsen. 2016. Effect of Mars Regolith on Growth of Anabaena variabilis. Western Section Meeting-ASPB. BYU, Provo, Utah.
- Diray-Arce, J., M.J. Clement and B.L. Nielsen. 2015. Using Bioinformatics as a tool to understand salt tolerance: de novo transcriptome assembly and differential expression analysis of the halophyte Suaeda fruticosa. BIOT 2105-Biotechnology & Bioinformatics Symposium. Brigham Young University, Provo, UT.
- Nielsen, B.L. and J. Diray-Arce. 2015. Differential expression analysis of genes involved in salt tolerance in the halophyte Suaeda fruticosa. Invited talk, 2nd International Conference on Physiological, Biochemical and Molecular Arguments for Salt Tolerance, Oct. 12-14, Doha, Qatar.
- Nielsen, B.L., S. Morley, V. Shedge and S.A. Mackenzie. 2015. Non-redundant functions of dual-localized organellar DNA replication proteins. Invited talk, 9th International Conference for Plant Mitochondrial Biology, May 17-22, Wroclaw, Poland.

- Nielsen, B.L., S. Morley and J.D. Cupp. 2015. Chloroplast DNA copy number variation during plant development and in replication protein mutants in Arabidopsis. Invited seminar, From Molecules to Cells seminar program, Humboldt University, May 26, Berlin, Germany.
- Morley, S.A. and B.L. Nielsen. 2015. DNA replication in plant mitochondria. Third Utah Plant Genetics Conference, Feb. 24, Aspen Grove, Utah.
- Nielsen, B.L. and J. Diray-Arce. 2014. Transcriptome and proteome analysis of genes involved in salt tolerance in the halophyte *Suaeda fruticosa*. Invited talk, International Conference on Halophytes for Food Security in Dry Lands, May 12-13, Doha, Qatar.
- Diray-Arce, J., M.J. Clement, B. Gul, M.A. Khan, and B.L. Nielsen 2014. Global Profiling, de novo assembly, differential expression and phylogeny of the halophyte *Suaeda fruticosa* to understand salinity tolerance. Poster, Biotechnology and Bioinformatics Symposium, Provo.
- Diray-Arce, J. and B.L. Nielsen. 2014. De novo transcriptome assembly and analysis of the halophyte *Suaeda fruticosa*. Poster, Plant and Animal Genome XXII, San Diego.

- Nielsen, B.L., J.D. Cupp, and J. Brammer. 2013. A tale of two polymerases: The dual-localized organelle DNA polymerases in Arabidopsis are not fully functionally redundant. Invited talk, 3rd International Symposium on Chloroplast Genomics & Genetic Engineering, New Brunswick, New Jersey.
- Diray-Arce, J., M.J. Clement, B. Gul, M.A. Khan, and B.L. Nielsen. 2013. Optimization and analysis of de novo transcriptome assembly of the halophyte *Suaeda fruticosa*. Poster, Biotechnology and Bioinformatics Symposium, Provo.
- Perry, C.*, K. Lu*, T. Alarcon*, D. Hedges and B.L. Nielsen. 2012. PCR markers, stress, and healthy aging. Annual meeting of the American Society for Biochemistry and Molecular Biology, abstract number 965.5.
- Nielsen, B.L. 2012. Characterization of a chloroplast DNA replication origin-binding protein. Invited talk, Utah Plant Genetics Conference, Aspen Grove, Utah.
- Nielsen, B.L. 2011. The role of two Arabidopsis dual-targeted organellar DNA polymerases in genome replication. Invited seminar, Alabama State University.
- Rennick, M.*, J. Kiser*, T. Alarcon*, V. Call, D. Hedges, B. Jensen^ and B.L. Nielsen. 2011. PCR based analysis of linkage between genetic markers and stress and anxiety disorders. Poster, American Society for Microbiology Intermountain Branch meeting, Ogden, Utah.
- Nielsen, B.L. 2010. Chloroplast DNA replication: ori-binding protein and dual-targeted DNA polymerases. Invited talk, 2nd International Symposium on Chloroplast Genomics & Genetic Engineering, Maynooth, Ireland.
- Nielsen, B.L. 2009. The role of the Arabidopsis TWINKLE homologue in regulation of mitochondrial genome copy number. Invited seminars, University of Nebraska Plant Science Initiative and Utah Plant Genetics Group.
- Cupp, J.D.* and B.L. Nielsen. 2009. Characterization of mitochondrial-targeted RecA in Arabidopsis. Poster, 9th International Plant Molecular Biology Congress.
- Brammer, J.* and B.L. Nielsen. 2009. The role of organelle-targeted DNA polymerases in mitochondrial DNA replication and recombination in *A. thaliana*. Poster, 9th International Plant Molecular Biology Congress.

- Nielsen, B.L. 2009. The Arabidopsis mitochondrial-localized TWINKLE homologue has DNA primase and DNA helicase activities. International Conference for Plant Mitochondrial Biology.
- Nielsen, B.L. 2008. Characterization of a novel mitochondrial TWINKLE protein in *A. thaliana* with both DNA primase and DNA helicase activities. Invited seminar, Auburn Univ. and Alabama State Univ.
- Nielsen, B.L., J.D. Cupp[^] and V.C. Willis*. 2006. Mitochondrial DNA recombination and repair in *Arabidopsis thaliana*. 8th International Congress of Plant Molecular Biology, abstract no. 595.

PRESENTATIONS TO COMMUNITY GROUPS

- Visited local public schools (Opelika, Alabama) to give presentations about microbiology and scientific research, at least once each year, 1990-1999.
- Recent Developments in Molecular Biology and Applications in Gene Therapy, public lecture given at New Mexico Highlands Univ., Las Vegas, NM, 1997.

OTHER EVIDENCE OF SCHOLARLY ACCOMPLISHMENTS

- Genbank DNA sequence submissions (a total of 4 submissions have been made):
Accession no. AY072877, Arabidopsis thaliana RecA protein, mRNA complete coding sequence, nuclear gene for mitochondrial targeted product (1170 bp), Fayaz Khazi and Brent L. Nielsen (2002).
Accession no. AY123764, Nicotiana tabacum chloroplast 16S ribosomal RNA-23S ribosomal RNA intergenic spacer region and 23S ribosomal RNA gene, partial sequences (3735 bp), B.L. Nielsen, S. Echols (2002).
- I served as host and mentor for a visiting Ph.D. student, Milagros Rodriguez-Lopez, from the Universidad Publica de Navarra in Navarra, Spain, from Sept. – Dec. 2001, and directed her research involving immunolocalization and electron microscopy of a protein involved in regulation of starch biosynthesis.
- I contributed to a successful proposal by faculty in the BYU Dept. of Chemistry and Biochemistry for funds from NIH to purchase a mass spectrometer for protein analysis (2001-2002).

GRADUATE STUDENT THESES AND DISSERTATIONS DIRECTED (AT BYU)

- Miller, Ashley (M.S.) Changes in plant gene expression in response to inoculation with halophilic bacteria in alfalfa grown in salty soil. in progress.
- Morley, Stewart A. (Ph.D.) Interactions between the organellar Pol1A, Pol1B, and Twinkle DNA replication proteins and their role in plant organelle DNA replication, 2019.
- Arce, Joann D. (Ph.D.) The path to understanding salt tolerance: global profiling of genes using transcriptomics of the halophyte *Suaeda fruticosa*, 2016.
- Cupp, John D. (Ph.D.) Characterization of the cellular and organellar dynamics that occur with a partial depletion of mitochondrial DNA when Arabidopsis DNA polymerase IB is mutated, 2012.

Brammer, Jeffrey (M.S.), Organellar DNA Polymerases Gamma I and II in *Arabidopsis thaliana*, 2010.

Song, Daqing (M.S.) Homologous Strand Exchange and DNA Helicase Activities in Plant Mitochondria, 2005.

Lassen, Matthew G. (M.S.) Identification of Proteins Involved in Chloroplast DNA Replication, 2004.

(A total of 7 Ph.D. and 7 M.S. students have completed their degrees under my direction)

PROFESSIONAL DEVELOPMENT ACTIVITIES AND DATES (LAST 15 YEARS)

Professional development leave, Univ. of Nebraska, Lincoln, June-October 2014, created constructs to study localization of DNA replication proteins in plant mitochondria and chloroplasts.

Attended the Frontiers & Techniques in Plant Science Course, June 29-July 19, 2012 at Cold Spring Harbor Laboratory, New York. Obtained training in new techniques in RNA and protein analysis and related topics.

New faculty mentor for Sandra Burnett, 2005-2010 and for Steven Johnson, 2009-2016. Participated in the 2003, 2004 and 2011 Publish and Flourish Scholarship Workshops at BYU.

Full Participant in BYU Faculty Development Series Spring Seminar and Development Program, 2001-2002.

Participated in 2001 Project Summer Institute on Biochemistry and Molecular Biology at Snowbird, Utah, July 25-28, 2001, with partial funding from the BYU Faculty Center.

GRANTING AGENCY AND JOURNAL AD HOC REVIEW ACTIVITIES

Journals that I have reviewed manuscripts for (15-18 per year) include:

Plant Physiology, Plant Cell, Plant Journal, Nature Plants, Nucleic Acids Research, Frontiers in Plant Sciences (guest associate editor for special issue), several Frontiers journals, Plants (also editor of special issue in 2019-20), Journal of Molecular Biology, Journal of Experimental Botany, BMC Genomics, PLOS One, Physiologia Plantarum, Biologia Plantarum, Plant Cell Reports, Journal of Virological Methods, Plant Science, Current Genetics, Protist, Industrial Crops and Products, Acta Physiologiae Plantarum, Emirates Journal of Food & Agriculture, and others

Granting Agency service as ad hoc reviewer:

National Institutes of Health (also several times as a study section review panel member, including 3 panel meetings in 2018-19), National Science Foundation (1-2 ad hoc reviews each year), USDA (once as review panel member, ~1 ad hoc review each year)

RESEARCH FUNDING (LAST 12 YEARS; MORE THAN \$2.6 MILLION TOTAL)

Title: Integrated undergraduate research in a saline alkali sink near Utah Lake
Roger Koide and Brent L. Nielsen

Source: Sant Foundation, Brigham Young University, Feb. 2019-April 2020, \$14,930.

Title: Diversity of halophilic microorganisms associated with halophytes

Source: Charles Redd Center for Western Studies, May 2016-Oct. 2017, \$3,000.
Project renewed for May 2018-Oct. 2019, \$3,000.

Title: Microbiome diversity of Utah halophytes and impact on plant adaptation to saline environments, Brent L. Nielsen.

Source: Sant Foundation, Brigham Young University, Feb. 2016-April 2017, \$10,000.

Title: Building Capabilities for the Molecular and Biochemical Characterization of Photosynthesis and Oxidative Stress Gene Expression in Halophytes with Potential Use as Non-Conventional Crops, Brent L. Nielsen and Ajmal Khan, Univ. of Karachi, Pakistan, PIs.

Source: U.S. Dept. of State/U.S. National Academies of Science, Nov. 2010-Feb. 2015, \$184,000.

Title: A Tale of Two Polymerases and Their Role in Arabidopsis Organelle DNA Replication, Brent L. Nielsen

Source: Brigham Young University (Mentoring), Jan. 2014-Jan. 2016, \$20,000.

Title: Identification and association of mitochondrial DNA mutations with fibromyalgia, Brent L. Nielsen and Mary Rennick

Source: BYU Emmeline B. Wells Scholarly Grant, Jan. 2012-Dec. 2013, \$25,000.

Title: Telomere length and association with mental and physical health in very healthy older adults and community-dwelling older adults, Brent L. Nielsen, Dawson W. Hedges and Vaughn R.A. Call

Source: Brigham Young University Gerontology Program, Jan. 2012-Feb. 2013, \$9,900.

Title: The Role of Two Dual Targeted DNA Polymerases in Plant Mitochondrial DNA Replication, Brent L. Nielsen

Source: Brigham Young University (Mentoring), March 2008-Dec. 2009, \$20,000.

Title: The effects on aging of genetic polymorphisms associated with stress tolerance. Dawson W. Hedges, Brent L. Nielsen and Vaughn R.A. Call

Source: Brigham Young University (Gerontology Program), February 2008-February 2010, \$18,000.

Title: Characterization of a Novel Mitochondrial DNA Primase/Helicase (TWINKLE) in *Arabidopsis thaliana*, Brent L. Nielsen

Source: Brigham Young University (Mentoring), March 2007-Dec. 2008, \$20,000.

Title: Mitochondrial DNA Recombination Proteins in Arabidopsis (competitive renewal), Brent L. Nielsen and Craig Coleman.

Source: NIH AREA Program, Sept. 1, 2005-Aug. 31, 2009, \$218,250.