CURRICULUM VITAE

Stephen A. Murray, Ph.D.

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The Jackson Laboratory
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Education

Carleton College, Northfield, MN	B.A.	1989-1993	Biology
Boston University School of Medicine	Ph.D.	1996-2002	Biochemistry (Z-X. Xiao, advisor)
The Jackson Laboratory, Bar Harbor, ME	postdoc	2002-2006	Development (T. Gridley, advisor)

Positions

1994-1996	Research Assistant Boston University School of Medicine Boston, MA
2007-2008	Associate Research Scientist The Jackson Laboratory
2008-2014	Research Scientist The Jackson Laboratory
2014-present	Senior Research Scientist The Jackson Laboratory
2012-present	Adjunct Assistant Professor University of Maine

Fellowships and Awards

1996-2001	NIH graduate training Fellowship, Boston University of Medicine
2002-2004	Institutional NRSA Postdoctoral fellowship (HD07065) in developmental genetics
2004	Awarded individual NRSA from NIH/NICHD (declined)
2004-2006	Individual Postdoctoral Fellowship (PF-04-245-010DDC) from the American Cancer Society
2005	Awarded the Renee G. Adelman Cancer Research Fund
2006	Fellowship from the American Cancer Society Midwest Division - Ann's Hope Foundation

Professional Activities

1997-1998	Lecturer, Early Medical School Selection Program (EMSSP) basic biochemistry course, Boston University School of Medicine, Boston, MA
2005-	Biology course guest lectures, College of the Atlantic, Bar Harbor, ME
2007-	Ad hoc manuscript review, *Genesis, Physiological Genomics, PLOSOne, Journal of Visualized Experiments, Disease Models and Mechanisms, Mammalian Genome, Nature Communications, American Journal of Medical Genetics, Human Molecular Genetics, Human Mutation, Developmental Biology, Cell Reports, Biology of Reproduction, Development*
2011-2012	Ad hoc member of the ICP1 NIH review panel

2012 Reviewed for the NIDCR ZDE MH14 Special Emphasis Panel
2012-2014 Project Director and Faculty Advisor, Genetic Engineering Technology (Molecular Biology, Cell Biology and Microinjection services), The Jackson Laboratory
2013-2015 Ad hoc member of Comparative Medicine Special Emphasis Panel
2013-Present Editorial board, *Mammalian Genome*
2014-2020 Member, NIDCR Special Grants Review Committee (DSR)
2015-Present Faculty Partner, Genetic Engineering Technology, The Jackson Laboratory

Ongoing Research Support

2 UM1 HG006332-06 Braun, **Murray**, Svenson (PI) 8/1/2016-7/31/2021
NIH/NHGRI
The Jackson Laboratory Knockout Mouse Production and Phenotyping Project (JAX KOMP2)
Renewal of the KOMP2 program.
Role: **Principal Investigator**

5 U42 OD011185-05 **Murray**, Taft Jr (PI) 09/07/11-07/31/17 (NCE)
NIH/OD
High Throughput Production and Cryopreservation of Knockout Mice-The objective of this project is to generate over 800 well-characterized knockout (KO) strains of mice over five years and deliver cohorts to the JAX KOMP2 Phenotyping Center.
Role: **Principal Investigator**

2 R24 OD011190-05 **Murray**, Smith (PI) 09/09/11-05/31/19
NIH/OD
CRE Driver Strain Resources
The overall goal of this project is to develop and distribute comprehensive Cre strain resources and information to the scientific community.
Role: **Principal Investigator**

2 P30 CA034196-29 Liu (PI) 07/01/14-06/30/19
NIH/NCI
Cancer Center Support (Core) Grant – Cancer Models Development Resource
The CMDR provides JAX Cancer Center (JAXCC) investigators access to existing cancer models and supports development of new mouse models tailored to specific cancer research questions of importance to the Cancer Center.
Role: **Co-Project Leader**

Completed Research Support

3 U54 HG006332-03S1 Braun, Svenson (PI) 08/01/13-07/31/16
NIH/NHGRI
The Jackson Laboratory KOMP2 Phenotyping Center - Administrative Supplement: Embryo Phenotyping
This proposal aims to expand the scope of the KOMP2 Program to include embryonic lethal phenotypes that are not only important for understand gene function, but are also key models of human birth defects.
Role: **Co-Investigator**

5 R24 OD011190-03S1 **Murray**, Eppig (PI) 09/05/13-08/31/15
NIH/OD
Cre Driver Strain Resources: EUCOMMTOOLS Supplement
The goal of this supplemental project is to generate and characterize 10-15 new cre driver strains in collaboration with EUCOMMTOOLS
Role: **Principal Investigator**

5 U42 OD011185-04S1 **Murray**, Taft Jr (PI) 08/01/14-07/31/15
NIH/OD

High Throughput Production and Cryopreservation of Knockout Mice-Administrative Supplement.
Develop technology and test feasibility of scaled production of knockout mice using CRISPR technology.
Role: **Principle Investigator**

5 U01 DE020052-05 **Murray** (PI) 09/21/09-04/30/14
NIH/NIDCR
Technology Project: Genetic Tools and Resources for Orofacial Clefting Research
The overall goal of this project is to facilitate orofacial clefting research by generating new mouse genetic tools and by providing a repository of mouse strains critical for clefting research community.
Role: **Principal Investigator**

5 U01 DE020052-04S1 **Murray** (PI) 8/15/2012-04/30/2014
NIH/NIDCR
Technology Project: Genetic Tools and Resources for Orofacial Clefting Research
The goal of this Competitive Revision is to identify, characterize and discover the causative gene(s) for spontaneous and induced models of craniofacial dysmorphology, and provide new models to the scientific community.
Role: **Principal Investigator**

3 P30 CA034196-28S3 Liu (PI) 09/21/09-04/30/14
NIH/NCI
Cancer Center Support (Core) Grant - Cell Biology/Microinjection
This service provides resources and techniques to scientists at The Jackson Laboratory for their transgenic mouse and tissue culture experiments, particularly for embryonic stem cells.
Role: **Project Leader**

5 R03 DE019451 **Murray** (PI) 8/15/2012-04/30/2014
NIH/NIDCR
Genetic Characterization of a Novel Model of Cleft Palate
The overall goal of this project is to develop a novel ENU-induced mouse model of cleft palate. The two Aims of this project are to 1) To genetically map and identify the specific gene that underlies the clfp4 mutation and 2) To define the developmental defects in clfp4 mice.
Role: **Principal Investigator**

5 R21 RR026117 **Murray** (PI) 09/07/09-08/31/12
NIH/NCRR
Enhancing the Utility of Cre Driver Lines Through Expanded Characterization
This project seeks to improve the value of the JAX Cre Repository by performing comprehensive characterization of Cre strains. The Aims are to 1) To develop and validate an expanded set of standardized protocols for comprehensive and high-throughput characterization of Cre driver line functionality; and 2) To systematically characterize the functionality of a panel of Cre mouse lines and provide the data to the scientific community.
Role: **Principal Investigator**

Peer-Reviewed Publications

1. Gacheru, S.N., Thomas, K.M., **Murray, S.A.**, Csiszar, K., Smith-Mungo, L.I., and Kagan, H.M. (1997). Transcriptional and post-transcriptional control of lysyl oxidase expression in vascular smooth muscle cells: effects of TGF-beta 1 and serum deprivation. *J Cell Biochem* 65, 395-407.

2. Gallo-Hendrikx, E., **Murray, S.A.**, Vonderhaar, B.K., and Xiao, Z.X. (2001). Vanadate disrupts mammary gland development in whole organ culture. *Dev Dyn* 222, 354-367.

3. You, H., Zheng, H., **Murray, S.A.**, Yu, Q., Uchida, T., Fan, D., and Xiao, Z.X. (2002). IGF-1 induces Pin1 expression in promoting cell cycle S-phase entry. *J Cell Biochem* 84, 211-216.

4. Zheng, H., You, H., Zhou, X.Z., **Murray, S.A.**, Uchida, T., Wulf, G., Gu, L., Tang, X., Lu, K.P., and Xiao, Z.X. (2002). The prolyl isomerase Pin1 is a regulator of p53 in genotoxic response. *Nature* 419, 849-853.

5. Gu, L., Ying, H., Zheng, H., **Murray, S.A.**, and Xiao, Z.X. (2003). The MDM2 RING finger is required for cell cycle-dependent regulation of its protein expression. *FEBS Lett* 544, 218-222.

6. Gu, L., Zheng, H., **Murray, S.A.**, Ying, H., and Jim Xiao, Z.X. (2003). Deregulation of Cdc2 kinase induces caspase-3 activation and apoptosis. *Biochem Biophys Res Commun* 302, 384-391.

7. **Murray, S.A.**, Zheng, H., Gu, L., and Jim Xiao, Z.X. (2003). IGF-1 activates p21 to inhibit UV-induced cell death. *Oncogene* 22, 1703-1711.

8. Collin, G.B., Cyr, E., Bronson, R., Marshall, J.D., Gifford, E.J., Hicks, W., **Murray, S.A.**, Zheng, Q.Y., Smith, R.S., Nishina, P.M., and Naggert, J.K. (2005). Alms1-disrupted mice recapitulate human Alstrom syndrome. *Hum Mol Genet* 14, 2323-2333.

9. **Murray, S.A.**, Yang, S., Demicco, E., Ying, H., Sherr, D.H., Hafer, L.J., Rogers, A.E., Sonenshein, G.E., and Xiao, Z.X. (2005). Increased expression of MDM2, cyclin D1, and p27Kip1 in carcinogen-induced rat mammary tumors. *J Cell Biochem* 95, 875-884.

10. **Murray, S.A.**, Carver, E.A., and Gridley, T. (2006). Generation of a Snail1 (Snai1) conditional null allele. *Genesis* 44, 7-11.

11. **Murray, S.A.**, and Gridley, T. (2006). Snail1 gene function during early embryo patterning in mice. *Cell Cycle* 5, 2566-2570.

12. **Murray, S.A.**, and Gridley, T. (2006). Snail family genes are required for left-right asymmetry determination, but not neural crest formation, in mice. *Proc Natl Acad Sci U S A* 103, 10300-10304.

13. Howell, G.R., Shindo, M., **Murray, S.**, Gridley, T., Wilson, L.A., and Schimenti, J.C. (2007). Mutation of a ubiquitously expressed mouse transmembrane protein (Tapt1) causes specific skeletal homeotic transformations. *Genetics* 175, 699-707.

14. **Murray, S.A.**, Oram, K.F., and Gridley, T. (2007). Multiple functions of Snail family genes during palate development in mice. *Development* 134, 1789-1797.

15. Escriva, M., Peiro, S., Herranz, N., Villagrasa, P., Dave, N., Montserrat-Sentis, B., **Murray, S.A.**, Franci, C., Gridley, T., Virtanen, I., and Garcia de Herreros, A. (2008). Repression of PTEN phosphatase by Snail1 transcriptional factor during gamma radiation-induced apoptosis. *Mol Cell Biol* 28, 1528-1540.

16. **Murray, S.A.**, Morgan, J.L., Kane, C., Sharma, Y., Heffner, C.S., Lake, J., and Donahue, L.R. (2010). Mouse gestation length is genetically determined. *PLoS One* 5, e12418.

17. Varlakhanova, N.V., Cotterman, R.F., deVries, W.N., Morgan, J., Donahue, L.R., **Murray, S.**, Knowles, B.B., and Knoepfler, P.S. (2010). myc maintains embryonic stem cell pluripotency and self-renewal. *Differentiation* 80, 9-19.

18. Besnard, V., Wert, S.E., Ikegami, M., Xu, Y., Heffner, C., **Murray, S.A.**, Donahue, L.R., and Whitsett, J.A. (2011). Maternal synchronization of gestational length and lung maturation. *PLoS One* 6, e26682.

19. Fairfield, H., Gilbert, G.J., Barter, M., Corrigan, R.R., Curtain, M., Ding, Y., D'Ascenzo, M., Gerhardt, D.J., He, C., Huang, W., Richmond, T., Rowe, L., Probst, F.J., Bergstrom, D.E., **Murray, S.A.**, Bult, C., Richardson, J., Kile, B.T., Gut, I., Hager, J., Sigurdsson, S., Mauceli, E., Di Palma, F., Lindblad-Toh, K., Cunningham, M.L., Cox, T.C., Justice, M.J., Spector, M.S., Lowe, S.W., Albert, T., Donahue, L.R.,

Jeddeloh, J., Shendure, J., and Reinholdt, L.G. (2011). Mutation discovery in mice by whole exome sequencing. *Genome Biol* 12, R86.

20. Hochheiser, H., Aronow, B.J., Artinger, K., Beaty, T.H., Brinkley, J.F., Chai, Y., Clouthier, D., Cunningham, M.L., Dixon, M., Donahue, L.R., Fraser, S.E., Hallgrimsson, B., Iwata, J., Klein, O., Marazita, M.L., Murray, J.C., **Murray, S.**, de Villena, F.P., Postlethwait, J., Potter, S., Shapiro, L., Spritz, R., Visel, A., Weinberg, S.M., and Trainor, P.A. (2011). The FaceBase Consortium: a comprehensive program to facilitate craniofacial research. *Dev Biol* 355, 175-182.

*21. **Murray, S.A.** (2011). Mouse resources for craniofacial research. *Genesis* 49, 190-199.

*22. Heffner, C.S., Herbert Pratt, C., Babiuk, R.P., Sharma, Y., Rockwood, S.F., Donahue, L.R., Eppig, J.T., and **Murray, S.A.** (2012). Supporting conditional mouse mutagenesis with a comprehensive cre characterization resource. *Nat Commun* 3, 1218.

*23. **Murray, S.A.**, Eppig, J.T., Smedley, D., Simpson, E.M., and Rosenthal, N. (2012). Beyond knockouts: cre resources for conditional mutagenesis. *Mamm Genome* 23, 587-599.

24. Xu, Y., Wang, Y., Besnard, V., Ikegami, M., Wert, S.E., Heffner, C., **Murray, S.A.**, Donahue, L.R., and Whitsett, J.A. (2012). Transcriptional programs controlling perinatal lung maturation. *PLoS One* 7, e37046.

25. Adams, D., Baldock, R., Bhattacharya, S., Copp, A.J., Dickinson, M., Greene, N.D., Henkelman, M., Justice, M., Mohun, T., **Murray, S.A.**, Pauws, E., Raess, M., Rossant, J., Weaver, T., and West, D. (2013). Bloomsbury report on mouse embryo phenotyping: recommendations from the IMPC workshop on embryonic lethal screening. *Dis Model Mech* 6, 571-579.

26. Taft, R.A., Low, B.E., Byers, S.L., **Murray, S.A.**, Kutny, P., and Wiles, M.V. (2013). The perfect host: a mouse host embryo facilitating more efficient germ line transmission of genetically modified embryonic stem cells. *PLoS One* 8, e67826.

27. Hopkins, J., Hwang, G., Jacob, J., Sapp, N., Bedigian, R., Oka, K., Overbeek, P., **Murray, S.**, and Jordan, P.W. (2014). Meiosis-specific cohesin component, Stag3 is essential for maintaining centromere chromatid cohesion, and required for DNA repair and synapsis between homologous chromosomes. *PLoS Genet* 10, e1004413.

*28. Curtain, M., Heffner, C.S., Maddox, D.M., Gudis, P., Donahue, L.R., and **Murray, S.A.** (2015). A novel allele of Alx4 results in reduced Fgf10 expression and failure of eyelid fusion in mice. *Mamm Genome* 26, 173-180.

*29. Davisson, M.T., Cook, S.A., Akeson, E.C., Liu, D., Heffner, C., Gudis, P., Fairfield, H., and **Murray, S.A.** (2015). Kidney adysplasia and variable hydronephrosis, a new mutation affecting the odd-skipped related 1 gene in the mouse, causes variable defects in kidney development and hydronephrosis. *Am J Physiol Renal Physiol* 308, F1335-1342.

30. Fairfield, H., Srivastava, A., Ananda, G., Liu, R., Kircher, M., Lakshminarayana, A., Harris, B.S., Karst, S.Y., Dionne, L.A., Kane, C.C., Curtain, M., Berry, M.L., Ward-Bailey, P.F., Greenstein, I., Byers, C., Czechanski, A., Sharp, J., Palmer, K., Gudis, P., Martin, W., Tadenev, A., Bogdanik, L., Pratt, C.H., Chang, B., Schroeder, D.G., Cox, G.A., Cliften, P., Milbrandt, J., **Murray, S.**, Burgess, R., Bergstrom, D.E., Donahue, L.R., Hamamy, H., Masri, A., Santoni, F.A., Makrythanasis, P., Antonarakis, S.E., Shendure, J., and Reinholdt, L.G. (2015). Exome sequencing reveals pathogenic mutations in 91 strains of mice with Mendelian disorders. *Genome Res* 25, 948-957.

31. Guimier, A., Gabriel, G.C., Bajolle, F., Tsang, M., Liu, H., Noll, A., Schwartz, M., El Malti, R., Smith, L.D., Klena, N.T., Jimenez, G., Miller, N.A., Oufadem, M., Moreau de Bellaing, A., Yagi, H., Saunders, C.J.,

Baker, C.N., Di Filippo, S., Peterson, K.A., Thiffault, I., Bole-Feysot, C., Cooley, L.D., Farrow, E.G., Masson, C., Schoen, P., Deleuze, J.F., Nitschke, P., Lyonnet, S., de Pontual, L., **Murray, S.A.**, Bonnet, D., Kingsmore, S.F., Amiel, J., Bouvagnet, P., Lo, C.W., and Gordon, C.T. (2015). MMP21 is mutated in human heterotaxy and is required for normal left-right asymmetry in vertebrates. *Nat Genet* 47, 1260-1263.

32. Lloyd, K.C., Meehan, T., Beaudet, A., **Murray, S.**, Svenson, K., McKerlie, C., West, D., Morse, I., Parkinson, H., Brown, S., Mallon, A.M., and Moore, M. (2015). Precision medicine: Look to the mice. *Science* 349, 390.

33. Sundberg, J.P., Dadras, S.S., Silva, K.A., Kennedy, V.E., **Murray, S.A.**, Denegre, J.M., Schofield, P.N., King, L.E., Jr., Wiles, M.V., and Pratt, C.H. (2015). Excavating the Genome: Large-Scale Mutagenesis Screening for the Discovery of New Mouse Models. *J Investig Dermatol Symp Proc* 17, 27-29.

*34. Dickinson, M.E., Flenniken, A.M., Ji, X., Teboul, L., Wong, M.D., White, J.K., Meehan, T.F., Weninger, W.J., Westerberg, H., Adissu, H., Baker, C.N., Bower, L., Brown, J.M., Caddle, L.B., Chiani, F., Clary, D., Cleak, J., Daly, M.J., Denegre, J.M., Doe, B., Dolan, M.E., Edie, S.M., Fuchs, H., Gailus-Durner, V., Galli, A., Gambadoro, A., Gallegos, J., Guo, S., Horner, N.R., Hsu, C.W., Johnson, S.J., Kalaga, S., Keith, L.C., Lanoue, L., Lawson, T.N., Lek, M., Mark, M., Marschall, S., Mason, J., McElwee, M.L., Newbigging, S., Nutter, L.M., Peterson, K.A., Ramirez-Solis, R., Rowland, D.J., Ryder, E., Samocha, K.E., Seavitt, J.R., Selloum, M., Szoke-Kovacs, Z., Tamura, M., Trainor, A.G., Tudose, I., Wakana, S., Warren, J., Wendling, O., West, D.B., Wong, L., Yoshiki, A., International Mouse Phenotyping, C., Jackson, L., Infrastructure Nationale Phenomin, I.C.d.I.S., Charles River, L., Harwell, M.R.C., Toronto Centre for, P., Wellcome Trust Sanger, I., Center, R.B., MacArthur, D.G., Tocchini-Valentini, G.P., Gao, X., Flicek, P., Bradley, A., Skarnes, W.C., Justice, M.J., Parkinson, H.E., Moore, M., Wells, S., Braun, R.E., Svenson, K.L., de Angelis, M.H., Herault, Y., Mohun, T., Mallon, A.M., Henkelman, R.M., Brown, S.D., Adams, D.J., Lloyd, K.C., McKerlie, C., Beaudet, A.L., Bucan, M., and **Murray, S.A.** (2016). High-throughput discovery of novel developmental phenotypes. *Nature* 537, 508-514.

35. Leduc, M.S., Niu, Z., Bi, W., Zhu, W., Miloslavskaya, I., Chiang, T., Streff, H., Seavitt, J.R., **Murray, S.A.**, Eng, C., Chan, A., Yang, Y., and Lalani, S.R. (2016). CRIPT exonic deletion and a novel missense mutation in a female with short stature, dysmorphic features, microcephaly, and pigmentary abnormalities. *Am J Med Genet A* 170, 2206-2211.

*36. Palmer, K., Fairfield, H., Borgeia, S., Curtain, M., Hassan, M.G., Dionne, L., Yong Karst, S., Coombs, H., Bronson, R.T., Reinholdt, L.G., Bergstrom, D.E., Donahue, L.R., Cox, T.C., and **Murray, S.A.** (2016). Discovery and characterization of spontaneous mouse models of craniofacial dysmorphology. *Dev Biol* 415, 216-227.

37. Samuelov, L., Li, Q., Bochner, R., Najor, N.A., Albrecht, L., Malchin, N., Goldsmith, T., Grafi-Cohen, M., Vodo, D., Fainberg, G., Meilik, B., Goldberg, I., Warshauer, E., Rogers, T., Edie, S., Ishida-Yamamoto, A., Burzenski, L., Erez, N., **Murray, S.A.**, Irvine, A.D., Shultz, L., Green, K.J., Uitto, J., Sprecher, E., and Sarig, O. (2016). SVEP1 plays a crucial role in epidermal differentiation. *Exp Dermatol.*

*38. Shaheen, R., Anazi, S., Ben-Omran, T., Seidahmed, M.Z., Caddle, L.B., Palmer, K., Ali, R., Alshidi, T., Hagos, S., Goodwin, L., Hashem, M., Wakil, S.M., Abouelhoda, M., Colak, D., **Murray, S.A.**, and Alkuraya, F.S. (2016). Mutations in SMG9, Encoding an Essential Component of Nonsense-Mediated Decay Machinery, Cause a Multiple Congenital Anomaly Syndrome in Humans and Mice. *Am J Hum Genet* 98, 643-652.

39. Ward, A., Hopkins, J., McKay, M., **Murray, S.**, and Jordan, P.W. (2016). Genetic Interactions Between the Meiosis-Specific Cohesin Components, STAG3, REC8, and RAD21L. *G3 (Bethesda)* 6, 1713-1724.

40. Liu, E.T., Bolcun-Filas, E., Grass, D.S., Lutz, C., **Murray, S.**, Shultz, L., and Rosenthal, N. (2017). Of mice and CRISPR: The post-CRISPR future of the mouse as a model system for the human condition. *EMBO Rep* 18, 187-193.

*41. Peterson, K.A., Beane, G.L., Goodwin, L.O., Kutny, P.M., Reinholdt, L.G., and **Murray, S.A.** (2017). CRISPRtools: a flexible computational platform for performing CRISPR/Cas9 experiments in the mouse. *Mamm Genome*.

42. Snyder, E.M., McCarty, C., Mehalow, A., Svenson, K.L., **Murray, S.A.**, Korstanje, R., and Braun, R.E. (2017). APOBEC1 complementation factor (A1CF) is dispensable for C-to-U RNA editing in vivo. *RNA* 23, 457-465.

* Corresponding author

Invited and symposium platform presentations (since 2011)

2011 Wadsworth Genetic Diseases in Children Conference, New York, NY (invited)
2011 North American Cystic Fibrosis Conference-Genetic Modifiers Workshop, Anaheim, CA (invited)
2011 20st Short Course on Experimental Models of Human Cancer, Bar Harbor, ME (invited instructor)
2011 KOMP2 kickoff/IMPC meeting, Washington DC (invited)
2011 InfraCOMP/IMPC meeting, Munich Germany (invited)
2012 Mouse as an Instrument for Ear Research IV, Bar Harbor, ME (invited)
2012 21nd Short Course on Experimental Models of Human Cancer, Bar Harbor, ME (invited instructor)
2012 JAX-UCONN Symposium (invited)
2012 Gordon Research Conference-Craniofacial Morphogenesis, Ventura, CA (abstract selected)
2012 26th International Mammalian Genome Conference, St. Petersburg, FL (abstract selected)
2012 InfraCOMP/IMPC meeting on Embryonic Lethal Phenotyping, Bloomsbury, London, UK (co-organizer and speaker)
2012 KOMP2/IMPC joint annual meeting, Bethesda, MD (invited)
2013 KOMP2/IMPC joint annual meeting, Galveston, TX (invited)
2013 22rd Short Course on Experimental Models of Human Cancer, Bar Harbor, ME (invited instructor)
2013 NHLBI Animal models of lung disease workshop, Bethesda, MD (invited)
2013 IMPC Phenotyping Workshop, Toronto, ON (invited)
2013 EUCOMMTOOLS/IMPC meeting, Rome, IT (invited)
2014 Guest seminar, Maine Medical Research Institute, Scarborough, ME (invited)
2014 Guest seminar, JAX Genomic Medicine, Farmington, CT (invited)
2014 Transgenic Technology 2014, Edinburgh, UK (invited)
2014 28th International Mammalian Genome Conference, Bar Harbor, ME (abstract-selected)
2014 Tenth Comparative Medicine Resource Director's Meeting, Bethesda, MD (invited)
2014 Guest seminar, Seoul National University, Seoul RK
2014 IMPC meeting, Barcelona SP (invited)
2014 5th Biannual March of Dimes/Burroughs Wellcome Fund Preventing Prematurity Symposium (invited)
2015 Jackson Laboratory CRISPR/Cas9 workshop, Bar Harbor, ME (invited instructor)
2015 24rd Short Course on Experimental Models of Human Cancer, Bar Harbor, ME (invited instructor)
2015 IMPC meeting, Seoul RK (invited)
2016 Transgenic Technology 2016, Prague, CZ (invited session chair)
2016 Guest seminar, University of South Carolina, Columbia, SC (invited)
2016 IMPC meeting, Strasbourg FR (invited)
2016 Guest seminar, Regeneron Pharmaceuticals, Tarrytown, NY (invited)
2016 Workshop on Neurogenetic Tools: Using Mouse Models to Study Human Disease (invited instructor)
2016 The Allied Genetics Conference, Orlando FL (abstract selected)
2016 Eleventh Comparative Medicine Resource Director's Meeting, Bethesda, MD (invited)
2016 25th Short Course on Experimental Models of Human Cancer, Bar Harbor, ME (invited instructor)
2016 Jackson Laboratory CRISPR/Cas9 workshop, Bar Harbor, ME (invited instructor)
2016 Mouse as an Instrument for Ear Research VI, Bar Harbor, ME (invited)

Mentoring

2006	The Jackson Laboratory Summer Student Program. Mentored Susan Lin, Project Title: *The role of the Snail gene in a mouse model of tumor metastasis*
2007	The Jackson Laboratory Summer Student Program. Mentored Stephanie Siegmund, Project Title: *Mapping and phenotypic characterization of a novel ENU-induced craniofacial mutant*
2009	The Jackson Laboratory Summer Student Program. Mentored Katelyn DeNegre, Project Title: *Characterization of cre driver lines for neurobiology research*
2012-2014	Jocelyn Sharp, University of Maine, Master of Science thesis
2013	The Jackson Laboratory Summer Student Program. Mentored Olivia Katz, Project Title: *Developmental genotyping and phenotyping of a novel mouse mutant*
2014-	Sarah Edie, Postdoctoral Fellow
2014-2016	Candice Baker, Postdoctoral Fellow
2015-2016	William Miller and Kevin Elk, high school interns
2016	Madison Luck, summer intern