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CURRICULUM VITAE

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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 AND APPOINTMENTS

1994-1996	Research Assistant Boston University School of Medicine
2007-2008	Associate Research Scientist The Jackson Laboratory
2008-2014	Research Scientist The Jackson Laboratory
2014-2017	Senior Research Scientist The Jackson Laboratory
2017-present	Associate Professor The Jackson Laboratory
2021-present	Research Associate Professor of Medicine Tufts University School of Medicine
2021-present	Member, Genetics Graduate Program Tufts University School of Medicine

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

2007-	Ad hoc manuscript review, *Genesis, Physiological Genomics, PLOSOne, Faseb Journal, Journal of Visualized Experiments, Disease Models and Mechanisms, Mammalian Genome, Nature Communications, American Journal of Medical Genetics, Human Molecular Genetics, Human Mutation, Scientific Reports, Developmental Biology, Cell Reports, Biology of Reproduction, Development, Nature Reviews Genetics, PNAS, Nature Methods, Plos Genetics, Genome Research, Genome Biology, Cell Metabolism, Cell, Developmental Cell, Nature Genetics*
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
2013-2016	Ad hoc member of Comparative Medicine Special Emphasis Panel
2013-2021	Editorial board, *Mammalian Genome*
2014-2020	Member, NIDCR Special Grants Review Committee (DSR)
2015-2017	Faculty Partner, Genetic Engineering Technology, The Jackson Laboratory
2017-2022	Faculty Partner, Genome Technologies, The Jackson Laboratory
2018-2022	Institutional Biosafety Committee, member
2019-	Grant review for Cystic Fibrosis Foundation
2019-	SAB member, National Ferret Resource and Research Center
2019-2020	JAX Scientific Advisory Council, Chair
2019-	ClinGen Syndromic Conditions Gene Curation Expert Panel
2020-	SAB member, Cystic Fibrosis Mouse Models Core, Case Western Reserve University, Cleveland, OH
2022	Reviewed for ZRG ENMR-B (55) Special Emphasis Panel
2022	Reviewed for ZRG MGG-V (55) Special Emphasis Panel
2022-	Editor-in-Chief, *Mammalian Genome*
2023-	Associate Director, Shared Resources, JAX Cancer Center Support Grant
2023-	Institutional Biosafety Committee, Chair

ONGOING RESEARCH SUPPORT

R01 DE032319 (Marazita, **Murray**) 9/1/2022 - 8/31/2027 1.20 Calendar
NIH/NIDCR
Genomic Risk Variants in Orofacial Clefting: Discovery and Functional Validation
The current project aims to continue our successful research program to discover genetic risk factors for this common birth defect in our very large resource of OFC families (n ~ 16,000), and then pursue functional follow-up for these signals.
Role: Principal Investigator (Multi)

Pacs1Syndrome-SM-01 (**Murray**)
PACS1 Syndrome Research Foundation 9/30/2023-3/31/2024 Effort only
Development and testing of genome editing strategies for treatment of PACS1 Syndrome
The goal of this project is to design and validate lead base editing strategies to treat PACS1 syndrome using a novel mouse model of the disease. New designs will be tested and optimized in vitro, and the off-target potential of these leads will be assessed. In addition, we will investigate the cause and timing of lethality in this model following ubiquitous activation of the mutant allele.
Role: Principal Investigator

U19 NS132304 (Lutz, Liu, Gray, Arbab, Costa) 4/1/2023 – 3/1/2028 1.80 Calendar
NIH/NINDS
Preclinical Genome Editing for Rare Neurological Diseases

The overall goal of this project is to develop genome editing IND-enabling therapeutic strategies, including base and prime editing, for important neurological diseases including Spinal Muscle Atrophy, Friedreich's Ataxia, Huntington's Disease, and Rett Syndrome.
Role: Co-investigator; Lead of Preclinical Mouse Model Core

UM1 OD023222-01 (Braun, **Murray**, White) 7/1/2022 - 6/30/2027 3.00 Calendar
NIH/NHGRI
The Jackson Laboratory Knockout Mouse Production and Phenotyping Project (JAX KOMP2)
The Knockout Mouse Phenotyping Program (KOMP2) seeks to create an encyclopedia of gene function for the ~20,000 genes in the mouse and to ultimately create a resource for understanding gene function in humans. The Jackson Laboratory (JAX) KOMP2 Phase 3 Center will contribute to this goal by efficiently generating and characterizing knockout lines and sharing functional data for 600 mouse genes.
Role: Principal Investigator

1 U54 OD030187-02 (**Murray**, Lutz) 9/1/2020 – 8/31/2025 1.80 Calendar
NIH/ORIP
The Jackson Laboratory Center for Precision Genetics
The overarching goal of the JAX Center for Precision Genetics (JCPG) is to integrate the core systems and platforms in place at JAX to create a seamless pipeline to support the model development needs of the clinical genetics community and to advance the development of therapeutic strategies for human disease.
Role: Principal Investigator

INV-0027204 (Braun) 12/1/2021 - 11/30/2024 0.60 Calendar
Bill & Melinda Gates Foundation
The Jackson Laboratory Non-hormonal Contraceptive Model Development Program
To characterize mouse models of fertility and infertility-associated genetic mutations in order to identify novel targets for non-hormonal contraceptive drug discovery.
Role: co-Investigator

2 P30 CA034196-35 (Liu) 4/1/2020 - 3/31/2025 0.60 Calendar
NIH/NCI
Cancer Center Support (CORE) Grant - Cancer Models Development Shared Resource
The Cancer Models Development Resource Shared Resource (CMDR) advises and supports JAX Cancer Center (JAXCC) members in the design, development, and use of advanced mouse models for cancer research, including genetically engineered mouse models (GEMMs), genetically diverse mapping panels, and patient-derived xenograft (PDX) platforms.
Role: Technical Lead

2 R24OD011190-11 (**Murray**, Smith) 8/1/2019 - 7/31/2023 (NCE) 1.20 Calendar
NIH/OD
CRE Driver Strain Resources
Our goal for this proposal also seeks to import an expanded set of Cre driver strains that will fill gaps in our collection and potentially replace critical strains that are confounded by off target activity. Together, these will provide the community with a comprehensive source of Cre driver tool strains and information about them.
Role: Principal Investigator

5 U42 OD026635-05 (**Murray**, Lutz) 9/18/2018 - 7/31/2023 (NCE) 2.40 Calendar
NIH/OD
The Jackson Laboratory Gene Editing Testing Center (JAX-GETC)
The goal of the SCGE program is to improve genome editing technologies to accelerate the translation of this technology into clinical applications and maximize the potential to treat as many diseases as possible.
Role: Principal Investigator

3 U42 OD026635-05S1 (**Murray**, Lutz) 8/1/2022 - 7/31/2023 (NCE) Effort only

NIH/OD
The Jackson Laboratory Gene Editing Testing Center (JAX-GETC)
The goal of this supplement is to test the efficacy of delivery of genome editing cargo in various nanoparticle formulations using Focused Ultrasound in collaboration with Dr. Kam Leong at Columbia University.

3 U42 OD026635-05S2 (**Murray**, Lutz) 8/1/2022 - 7/31/2023 (NCE) Effort only
NIH/OD
The Jackson Laboratory Gene Editing Testing Center (JAX-GETC)
The goal of this supplement is to perform a rigorous comparison of genome editor delivery capacity of various nanoparticle and RNP formulations using a single mode of administration: Convection Enhanced Delivery (CED).

3 U42 OD026635-05S3 (**Murray**, Lutz) 8/1/2022 - 7/31/2023 (NCE) Effort only
NIH/OD
The Jackson Laboratory Gene Editing Testing Center (JAX-GETC)
This supplement to the JAX-GETC will test novel genome editing therapeutic strategies in two models of Charcot-Marie-Tooth Disease, in collaboration with Dr. Rob Burgess at JAX and Bruce Conklin at the Gladstone institute.

3 U42 OD026635-05S4 (**Murray**, Lutz) 8/1/2022 - 7/31/2023 (NCE) Effort only
NIH/OD
The Jackson Laboratory Gene Editing Testing Center (JAX-GETC)
This supplement to the JAX-GETC will test two novel genome editing therapeutic strategies in a model of TTN truncating variant-induced cardiomyopathy, in collaboration with Dr. Travis Hinson at UConn Health/JAX-GM.

COMPLETED RESEARCH SUPPORT

DIF-Orofacial Morphogenesis 01/25/2021 – 07/24/2022 0.60 Calendar
The Jackson Laboratory-Directors Fund
Developmental Systems Genomics of Orofacial Morphogenesis
The overall goal of this DIF proposal is to establish a framework for the use of diversity genetic resources to understand the role of genetic variation in the development of the mammalian secondary palate, addressing the unique challenges of a developmental study and demonstrating the feasibility of developmental systems genomics in the mouse.
Role: Principal Investigator

2 P30 CA034196-35 (Liu) 4/1/2020 - 3/31/2025 0.24 Calendar
NIH/NCI
Cancer Center Support (CORE) Grant - Genome and Single Cell Technologies Shared Resource
The key function of The Jackson Laboratory Cancer Center (JAXCC) Genome and Single Cell Technologies Shared Resource (GSCT) is the provision of genomic technologies to sequence the genomic structures (DNA, RNA, epigenome) and to precisely define the molecular features of individual cells.
Role: Co-Project Lead

5 UM1 OD023222-10, (NCE) (Braun, **Murray**, White) 8/2/2016 - 7/31/2022 4.56 Calendar
NIH/OD
The Jackson Laboratory Knockout Mouse Production and Phenotyping Project (JAX KOMP2)
The specific goal of this project is to expand the JAX KOMP2 Center to produce and phenotype 1,500 novel lines of knockout mice on an isogenic C57BL/6N background, and to share these animal resources and data with the scientific community.
Role: Principal Investigator

3 UM1 OD023222-10S1, (NCE) (Braun, **Murray**, White) 9/11/2020 – 7/31/2022 0.01 Calendar

NIH/OD
The goal of the project is to create a second-generation mouse model platform incorporating diverse genetic backgrounds, to characterize the variation in SARS-CoV-2 infection dynamics and the development of clinically-relevant disease.
Role: Principal Investigator

3 UM1 OD023222-10S2 (Braun, **Murray**, White) 8/3/2021 - 7/31/2022 0.01 Calendar
NIH/OD
The Jackson Laboratory Knockout Mouse Production and Phenotyping Project (JAX KOMP2)
The purpose of this request for a funded extension beyond the current project period is to complete the initial goals of creating and phenotyping 1000 lines of KO mice. The Specific Aims of this funded extension are to breed and populate the EAP (Early Adult Pipeline) from the remaining 140 mouse lines to bring our total to 1000 lines.
Role: Principal Investigator

3 UM1 OD023222-10S3 (Braun, **Murray**, White) 8/4/2021 - 7/31/2022 0.01 Calendar
NIH/OD
The Jackson Laboratory Knockout Mouse Production and Phenotyping Project (JAX KOMP2)
This supplement provides funds to generate 25 new homozygous viable gene knockout mouse lines.
Role: Principal Investigator

5 R01 HL142788-04 (Lo, Tsang) 7/1/2018 - 4/30/2022 0.36 Calendar
NIH/NHLBI
Mechanism of LV Hypoplasia in Hypoplastic Left Heart Syndrome
The objective of this proposal is to delineate the cellular, molecular and genetic mechanisms of ventricular hypoplasia in hypoplastic left heart syndrome (HLHS), a congenital defect with marked hypoplasia of the left ventricle that essentially leaves the conceptus with only a single pumping chamber.
Role: Consortium PI

5 U24 HG010423-02 (Dwinell) 1/1/2020 - 11/30/2021 0.01 Calendar
NIH/NHGRI
Dissemination and Coordinating Center for the SCGE Consortium; Development of a GFP-IVS2 Mouse Reporter Strain for PNA-based Genome Editing Detection
The goal is to develop a novel small animal model reporter strain that can be used to evaluate PNA-based gene editing therapies using a splicing strategy to activate the reporter gene.
Role: Consortium PI

5 U24 HG010423-02 (Dwinell) 1/1/2020 - 11/30/2021 0.01 Calendar
NIH/NHGRI
Dissemination and Coordinating Center for the SCGE Consortium; Improved Reporters to Evaluate Base Editor Activity in Mice
The goal of this work is to generate three knockin mouse models to support the use of base editors in therapeutic contexts.
Role: Consortium PI

5 UM1 OD023222-08S3 Braun, **Murray**, White (MPI) 8/1/18-7/31/20 (NCE)
NIH/OD
The Jackson Laboratory Knockout Mouse Production and Phenotyping Project (JAX KOMP2)
This administrative supplement supports a pilot project to generate precision models for novel mutations identified by the Gabriella Miller Kids First program.
Role: **Principal Investigator**

5 UM1 OD023222-09S1 Braun, **Murray**, White (MPI) 8/1/18-7/31/20 (NCE)
NIH/OD

The Jackson Laboratory Knockout Mouse Production and Phenotyping Project (JAX KOMP2)
This administrative supplement supports a pilot project to establish F0 mutagenesis and phenotyping for highly constrained genes predicted to be essential.
Role: **Principal Investigator**

3U42 OD026635-02S1 **Murray**, Lutz (MPI) 8/1/19-7/31/20 (NCE)
NIH/OD
AAV Tropism Supplement
The goal of this supplement is to systematically test the tropism of a panel of AAV serotypes in mice to establish a data resource for the SCGE and the scientific community.
Role: **Principal Investigator**

1R21 OD024941 **Murray** (MPI) 02/13/18-12/31/20 (NCE)
NIH/OD
Rapid In Vivo Modeling of Developmental Disorders
The goal of this project is to optimize CRISPR/Cas9 mutagenesis for direct phenotyping of F0 embryos and to apply this platform to specific human developmental diseases that would benefit from a direct F0 approach.
Role: **Principal Investigator**

DIF18-SM 9/18/18-2/29/20
JAX internal – Director Innovation Fund
Establishing the JAX High-throughput phenotyping pipeline (HTP)
The goal of this project is to develop a data analysis and visualization infrastructure using the Mouse Phenome Database framework for the data from the current KOMP2 pipeline to allow the pipeline to be extended to other project types.
Role: **Principal Investigator**

2 P30 CA034196 Liu (PI) 07/01/14-06/30/20
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**

5 UM1 OD023222-08S4 Braun, **Murray**, White (MPI) 8/1/18-7/31/19 (NCE)
NIH/OD
The Jackson Laboratory Knockout Mouse Production and Phenotyping Project (JAX KOMP2)
This administrative supplement supports a pilot project to generate microbiome profiles for all KOMP2 Centers.
Role: **Principal Investigator**

5 U42 OD011185 **Murray**, Taft Jr (PI) 09/07/11-07/31/17
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**

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 U42 OD011185-05S1 **Murray**, Taft Jr (PI) 08/01/15-07/31/16
NIH/OD
High Throughput Production and Cryopreservation of Knockout Mice-Administrative Supplement.
Generate 100 KO models using CRISPR/Cas9
Role: **Principle Investigator**

5 U01 DE020052 **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. PubMed PMID: 9138095.

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. PubMed PMID: 11747071.

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. PubMed PMID: 11787050.

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. PubMed PMID: 12397361.

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. PubMed PMID: 12782320.

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. PubMed PMID: 12604359.

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. PubMed PMID: 12642873.

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. PubMed PMID: 16000322; PMCID: PMC2862911.

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. PubMed PMID: 15844214.

10. **Murray, S.A.**, Carver, E.A., and Gridley, T. (2006). Generation of a Snail1 (Snai1) conditional null allele. *Genesis 44*, 7-11. PubMed PMID: 16397867.

11. **Murray, S.A.**, and Gridley, T. (2006). Snail1 gene function during early embryo patterning in mice. *Cell Cycle 5*, 2566-2570. PubMed PMID: 17106264.

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. PubMed PMID: 16801545; PMCID: PMC1502452.

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. PubMed PMID: 17151244; PMCID: PMC1800629.

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. PubMed PMID: 17376812.

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. PubMed PMID: 18172008; PMCID: PMC2258777.

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. PubMed PMID: 20811634; PMCID: PMC2928290.

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. PubMed PMID: 20537458; PMCID: PMC2916696.

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. PubMed PMID: 22096492; PMCID: PMC3212521.

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. PubMed PMID: 21917142; PMCID: PMC3308049.

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. PubMed PMID: 21458441; PMCID: PMC3440302.

*21. **Murray, S.A.** (2011). Mouse resources for craniofacial research. *Genesis 49*, 190-199. PubMed PMID: 21309071; PMCID: PMC3610317.

*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. PubMed PMID: 23169059; PMCID: PMC3514490.

*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. PubMed PMID: 22926223; PMCID: PMC3655717.

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. PubMed PMID: 22916088; PMCID: PMC3423373.

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. PubMed PMID: 23519032; PMCID: PMC3634642.

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. PubMed PMID: 23844102; PMCID: PMC3699516.

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have or had research contracts with Biocon, Takeda, Theravance, and Curadim and JPS is a consultant for Bioniz all of which have no relevance to this project. This does not alter our adherence to PLOS ONE policies on sharing data and materials. TS, NEG, LAD, LSB, OF, RK, SAM, RHR, and CHP state no conflicts of interest.

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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 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 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 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 (invited)
2014 IMPC meeting, Barcelona SP (invited)
2014 5th Biannual March of Dimes/Burroughs Wellcome Fund Preventing Prematurity Symposium (invited)
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 The Allied Genetics Conference, Orlando FL (abstract selected)
2016 Eleventh Comparative Medicine Resource Director's Meeting, Bethesda, MD (invited)
2016 Mouse as an Instrument for Ear Research VI, Bar Harbor, ME (invited)
2017 Guest seminar, PreventionGenetics, Marshfield, WI (invited)
2017 IMPC meeting, Nanjing, China (invited)
2017 Guest Webinar, Ambry Genetics (invited)
2017 Mutant Mouse Resource & Research Centers annual meeting, Farmington, CT (invited)
2017 Workshop on Phenotyping Mouse Models of Lung Disease, Bar Harbor, ME (invited)
2018 IACUC 2018, Columbus, OH (invited)
2018 IMPC meeting, Toronto, CA (invited)
2018 12th Comparative Medicine Resource Directors Meeting, Rockville, MD (invited)
2018 NHGRI Genome Sequencing Program (GSP) meeting, Bethesda, MD (invited)
2018 Mouse as an Instrument for Ear Research VII, Bar Harbor, ME (invited)
2019 Guest Seminar, Cincinnati Children's Hospital Medical Center (invited)

2019 NHLBI TopMED workshop (invited)
2019 Society for Craniofacial Genetics and Developmental Biology, Houston, TX (invited plenary)
2019 IMPC meeting, NIH Stakeholder meeting, Washington, DC (invited)
2020 Guest Seminar, Case Western Reserve University (invited)
2020 IMPC meeting, virtual (invited)
2020 JAX Scientific Services Open Day, Bar Harbor, ME (invited)
2021 Fetal-seq Consortium Meeting, virtual (invited)
2021 Guest Seminar, NIEHS, virtual (invited)
2021 American Society for Human Genetics, virtual (invited speaker)
2022 Genome Writers Guild, virtual (invited speaker)
2022 PACS1 4th Annual Scientific Conference, New York, NY (invited speaker)
2023 Rare Disease Research Forum, Farmington CT (invited speaker)
2023 NICDH Council poster presentation for Kids First program
2023 IMPC Oxford (invited speaker)
2023 PACS1 5th Annual Scientific Conference, New York, NY (invited speaker)

TEACHING AND EDUCATION

1997-1998 Lecturer, Early Medical School Selection Program (EMSSP) basic biochemistry course, Boston University School of Medicine, Boston, MA
2005-2010 Biology course guest lectures, College of the Atlantic, Bar Harbor, ME
2011 20st Short Course on Experimental Models of Human Cancer, Bar Harbor, ME (instructor)
2012 21nd Short Course on Experimental Models of Human Cancer, Bar Harbor, ME (instructor)
2013 22rd Short Course on Experimental Models of Human Cancer, Bar Harbor, ME (instructor)
2015 Jackson Laboratory CRISPR/Cas9 workshop, Bar Harbor, ME (instructor)
2015 24rd Short Course on Experimental Models of Human Cancer, Bar Harbor, ME (instructor)
2016 Workshop on Neurogenetic Tools: Using Mouse Models to Study Human Disease (instructor)
2016 25th Short Course on Experimental Models of Human Cancer, Bar Harbor, ME (instructor)
2016 Jackson Laboratory CRISPR/Cas9 workshop, Bar Harbor, ME (instructor)
2017 21st Century Mouse Genetics Course, Bar Harbor, ME (instructor)
2018 Workshop on Neurogenetic Tools, Bar Harbor, ME (instructor)
2018 Course Instructor, Mammalian Genetics II (Tufts Genetics course)
2018 Course Instructor, Mammalian Genetics I ((Tufts Genetics course)
2018 21st Century Mouse Genetics Course, Bar Harbor, ME (instructor)
2019 Co-Course Director, Mammalian Genetics (Tufts Genetics course)
2020 Co-Course Director, Mammalian Genetics (Tufts Genetics course)
2021 Advanced Human Genetics Course lecture or models of disease (Harvard Medical School Genetics Training Program; instructor)
2021 Course Instructor, CSHL Mouse Engineering Virtual Minicourse (instructor)
2021 Course Instructor, Mammalian Genetics (Tufts Genetics course)
2022 Course Instructor, Mammalian Genetics (Tufts Genetics course)
2023 Advanced Human Genetics Course lecture or models of disease (Harvard Medical School Genetics Training Program; instructor)
2023 CSHL mouse development course (Instructor)

MENTORING

2006 Susan Lin, The Jackson Laboratory Summer Student Program
2007 Stephanie Siegmund, The Jackson Laboratory Summer Student Program
2009 Katelyn DeNegre, The Jackson Laboratory Summer Student Program
2012-2014 Jocelyn Sharp, University of Maine, Master of Science thesis
2013 Olivia Katz, The Jackson Laboratory Summer Student Program
2014-2018 Sarah Edie, Postdoctoral Fellow
2014-2016 Candice Baker, Postdoctoral Fellow
2015-2016 William Miller, high school intern

2015-2016	Kevin Elk, high school intern
2016	Madison Luck, summer intern
2017	Amelia Meles, The Jackson Laboratory Summer Student Program
2017-2023	Nicholas Tolman – Tufts Ph.D. Thesis Committee
2018	Ali Ladha, The Jackson Laboratory Summer Student Program
2018	Cesar Gonzales, Post-baccalaureate intern
2019-2021	Alana Luzzio, Research Intern
2019	Ben Clauss, Tufts Genetics rotation
2019	Haley Fortin, Tufts Genetics rotation
2019	Logan Schwartz, Tufts qualifying exam committee (Chair)
2019	Zach Kulstad, Carleton College Externship
2019	Astrid Petropolous, Carleton College Externship
2019	Ayano Ishimura, high school intern
2020	Elli Hartig, Tufts qualifying exam committee (Chair)
2020-2022	Luke Parsely – Tufts Ph.D. Thesis Committee
2020-	Haley Fortin – Tufts Ph.D. Thesis Committee
2020-	Eric Bogenschutz, Postdoctoral Fellow
2021-	Sherrea Brown, Tufts Ph.D. Student
2022	Tess Kelly, The Jackson Laboratory Summer Student Program
2023	Aria Hossein, The Jackson Laboratory Summer Student Program
2023	Sig Reinholdt, MDI high school intern
2023-	Shawn David, UMaine Ph.D. Thesis Committee
2023-	Arad Bustan, Tufts Ph.D. Thesis Committee