

CURRICULUM VITAE

Wayne K. Potts

February 2021

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EDUCATION

Brigham Young University - B.S. 1974 – Zoology, Cum Laude

University of Montana - 1975

Utah State University - M.S. 1978, Biology, Major advisor: Dr. Kieth Dixon

University of Washington - Ph.D. 1986, Zoology, Major advisor: Dr. Sievert Rohwer

NIH Fellow - 1986-1989, Pathology, Univ. of Florida, Sponsor: Dr. Edward Wakeland

FACULTY APPOINTMENTS

Assistant Research Scientist, Dept. of Pathology, Univ. of Florida, 1990 – 92

Assistant Professor, Dept. of Pathology, Univ. of Florida, 1992 – 1996

Assistant Professor, Dept. of Zoology, Univ. of Florida, 1993 – 1996

Associate Professor, Dept. of Pathology, Univ. of Florida, 1996

Associate Professor, Dept. of Biology, University of Utah, 1996 – 2003

Professor, Dept. of Biology, University of Utah, 2003 – present

Adjunct Professor of Pathology, University of Utah, 2005 – present

OTHER TRAINING

United States Army Officer Training and Rotary Wing Flight Schools, 1969 – 71

PROFESSIONAL SOCIETIES

American Association for the Advancement of Science

American Society of Naturalists

Association for the Study of Animal Behavior

Society for the Study of Molecular Biology and Evolution

Society for the Study of Evolution

SERVICE AS REVIEWER

American Journal of Human Genetics

American Naturalist

Animal Behavior

Auk

Behavior Ecology and Sociobiology

Behavioural Brain Research

Behavioural Processes

BMC Evolutionary Biology

BMC Genetics

BMC Medical Genetics

Current Biology

Ecology Letters
Ethology
Ethology Ecology and Evolution
Evolution
Evolution and Human Behavior
Frontiers in Zoology
Functional Ecology
Genes, Brain and Behavior
Genetics
Immunogenetics
Immunology Today
International Journal of Primatology
Journal of Evolutionary Biology
Journal of Chemical Ecology
Journal of Immunology
Molecular Biology and Evolution
Molecular Ecology
Nature
Nature Genetics
Nature Reviews Genetics
Nature Reviews Immunology
Physiology and Behavior
Psychoneuroendocrinology
PLOS Biology
PLOS Genetics
PLOS ONE
Proceedings of the National Academy of Sciences
Proceedings of Royal Society of London
Science
Trends in Ecology and Evolution
Trends in Immunology

SERVICE

Max Plank Scientific Advisory Board (1999-2005)
NIH NAID Panel “Population genetics analysis program: immunity to vaccines/infections”, 2004
NSF Advisory Panel - Postdoctoral Research Fellowships in Molecular Evolution
NSF Ad Hoc Reviewer for Population Biology and Systematics Advisory Panel
NSF Ad Hoc Reviewer for Animal Behavior Advisory Panel
Opponent for Petteri Ilmonen’s dissertation disputation, University of Turku, Finland

SCHOLARSHIPS, FELLOWSHIPS, HONORS, AND AWARDS

Distinguished Scholarly and Creative Research Award – University of Utah – 2015
Judge for Allee Awards at the 1994 Animal Behavior Society Meeting –
Seattle, Washington
NSF Travel Award for the XXI International Ethological Conference –
Utrecht, Netherlands – 1993
NIH Post-Doctoral Fellowship, Tumor Biology Training Grant, 1986 – 1987
Achievement Reward for College Scientists (ARCS) –1985
Jessup-McHenry Fellowship - Philadelphia Academy of Sciences – 1982
Research Grant – Sigma Xi – 1977
Graduate Fellowship – Utah State University – 1975-76
Cum Laude graduate – Brigham Young University – 1974
Music Scholarship – Brigham Young University – 1967-68 and 1971-74

PATENTS

Assays for performance of organisms in phenotrons
WK Potts – US Patent 8,304,208; 2012

GRANTS

National Institutes of Health Individual NRSA Grant, *Selective mechanisms that maintain MHC polymorphisms*, Jan. 1988 through Jan. 1990
National Institutes of Health Grant RO1 GM-39578, *Analysis of selective mechanisms maintaining MHC polymorphisms*, Co-investigator with Edward K. Wakeland, PI, Jan. 1989 through Dec. 1993
National Science Foundation Grant BSR-9021902, *Demography and fragmentation in the Florida scrub jay: a genetic analysis*, Co-investigator with John Fitzpatrick, Glen Wolfenden, and David McDonald, Feb. 1991 through Feb. 1993
National Science Foundation Grant OCE-9006392, *Reproductive behavior of Limulus polyphemus*, H. Jane Brockman, PI, Subcontract to W.K. Potts for genetic analysis of paternity, March 1991 through March 1994
National Science Foundation Grant - *Endocrine and immune system effects on sexual selection and reproductive behavior in red jungle fowl*, Marlene Zuk, PI, Subcontract to W.K. Potts for genetic analysis of MHC genes, Jan. 1992 through Jan. 1994
National Science Foundation Grant IBN-9222177 - *MHC-associated patterns of mating, kin recognition, and genetic diversity in six vertebrate species*, June 1993 through June 1996 (\$259,000)
National Institutes of Health Grant RO1 39578 - *Selective mechanisms maintaining H-2 polymorphisms*, July 1994 through July 1998 (\$804,000)
National Institutes of Health Grant RO1 39578 (interim) - *Selective mechanisms maintaining H-2 polymorphisms*, July 1998 through July 1999 (\$60,000)
National Science Foundation Grant (interim) - *Recognition of kin and mates through MHC genes: chemosensory and imprinting mechanisms*, Sept. 1998 through Sept. 1999 (\$56,000)

- National Science Foundation Grant IBN-9817008 (co-PI with Nigella Hillgarth PI) – *Mechanisms of androgen-mediated immunocompetence in mice*, April 1999 through March 2001 (\$260,000)
- National Institutes of Health Grant 2 RO1 GM39578-10A1- *Selective mechanisms maintaining H-2 polymorphisms*, July 1999 through July 2002 (\$1,056,380)
- National Science Foundation Grant IBN-9904609– *Histocompatibility genes and sexual selection: chemosensory mechanisms and parasite resistance*, Sept. 1999 through Sept. 2002 (\$360,000)
- National Science Foundation Research Experience for Undergraduates – Supplement to Grant IBN-9904609– *Histocompatibility genes and sexual selection: chemosensory mechanisms and parasite resistance*, July 2001 through July 2002 (\$10,000)
- National Institutes of Health – Supplement to Grant 2 RO1 GM39578-10A1- *Selective mechanisms maintaining H-2 polymorphisms*, July 2001 through July 2002 (\$40,422)
- National Science Foundation Research Experience for Undergraduates – Supplement to Grant IBN-9817008 – *Mechanisms of androgen-mediated immunocompetence in mice*, Jan. 2002 through Jan. 2003 (\$12,500)
- Western Alliance to Expand Student Opportunities (WAESO) – Grant to support under-represented minority students in science - *Phenotyping Hox mutants using ecological functional genomics*, Fall semester 2003 thru winter 2004 (\$3,506)
- National Science Foundation - Western Alliance to Expand Student Opportunities (WAESO) – Grant to support under-represented minority students in science - *Phenotyping Hox mutants using ecological functional genomics*, Winter semester 2005 (\$1,700)
- National Science Foundation – *Ecological functional genomics of cryptic-phenotype Hox gene knockouts* – IBN-0344907, March 2004 through March 2006 (\$280,000)
- Canine Health Foundation – *Histocompatibility alleles conferring susceptibility to canine diabetes, immune-mediated thyroiditis and immune-mediated hemolytic anemia* – #305 - July 2004 through July 2006 (\$120,960)
- National Institutes of Health – *Ecological functional genomics: phenotyping Hox mutants* – RO1-GM039578, June 2004 through June 2009 (incl. 1yr no-cost extension) (\$1,160,122)
- National Science Foundation – *Pathogen adaptation to specific host genotypes: implications for host-pathogen coevolution* DEB 0918969, July 2009 through June 2014 (\$985,070)
- National Science Foundation – DISSERTATION RESEARCH: *Characterizing the genetic basis of virus adaptation to genotypes of its' mammalian host* - DEB 0910052, April 2009 through April 2011
- National Science Foundation – DISSERTATION RESEARCH: *The (epi)genetic basis of increased MUP expression during rapid adaptation to sociality in MUS* - IOS 0909801, June 2009 through May 2011
- National Science Foundation – HRD-1101728 - Western Alliance to Expand Student Opportunities (WAESO) – Grant to support under-represented minority students in science - *Organismal performance assays for broad, sensitive toxicity assessment*. Fall semester 2010 (\$1,756)

- National Science Foundation – HRD-1101728 - Western Alliance to Expand Student Opportunities (WAESO) – Grant to support under-represented minority students in science -Organismal performance assays for broad, sensitive toxicity assessment. Spring semester 2011 (\$1,756)
- National Science Foundation – HRD-1101728 - Western Alliance to Expand Student Opportunities (WAESO) – Grant to support under-represented minority students in science - *Organismal performance assays for broad, sensitive toxicity assessment*. Fall semester 2011 (\$3,256)
- National Science Foundation – HRD-1101728 - Western Alliance to Expand Student Opportunities (WAESO) – Grant to support under-represented minority students in science - *Transmission, host diversity and the evolution of virulence*. 2015 (\$5,134)
- National Institutes of Health – 1R01GM109500 - *Manipulation of transmission and host genetic diversity to understand the evolution and spread of virulent infectious disease*. Sept. 2013 thru Sept. 2018. (\$1,023,956, directs)
- Western Alliance to Expand Student Opportunities (WAESO) – Grant to support under-represented minority students in science – *Host Genetic Diversity*. Fall 2016. (\$2,378)
- Western Alliance to Expand Student Opportunities (WAESO) – Grant to support under-represented minority students in science – *What mechanisms link paternal social status to offspring body mass*. Spring 2017. (\$2,378)
- Western Alliance to Expand Student Opportunities (WAESO) – Grant to support under-represented minority students in science – *The Influence of Pathogen Diversity on Virulence Evolution*. Summer 2017. (\$2,378)
- Western Alliance to Expand Student Opportunities (WAESO) – Grant to support under-represented minority students in science – *Pathogen Diversity*. Fall 2017. (\$2,378)
- Western Alliance to Expand Student Opportunities (WAESO) – Grant to support under-represented minority students in science – *The Influence of Pathogen Diversity on Virulence Evolution*. Spring 2018. (\$2,378)
- Western Alliance to Expand Student Opportunities (WAESO) – Grant to support under-represented minority students in science – *The Influence of Pathogen Diversity on Virulence Evolution*. Summer 2018. (\$2,378)
- Western Alliance to Expand Student Opportunities (WAESO) – Grant to support under-represented minority students in science – *The Influence of Pathogen Diversity on Virulence Evolution: Phase V*. Fall 2018. (\$3,463.50)
- Western Alliance to Expand Student Opportunities (WAESO) – Grant to support under-represented minority students in science – *The Influence of Pathogen Diversity on Virulence Evolution: Phase VI*. Spring 2019. (2,463.50)
- Western Alliance to Expand Student Opportunities (WAESO) – Grant to support under-represented minority students in science – *The Influence of Pathogen Diversity on Virulence Evolution: Phase VII*. Summer 2019. (\$2,463.50)
- Western Alliance to Expand Student Opportunities (WAESO) – Grant to support under-represented minority students in science – *Pathogen Diversity*. Fall 2019. (\$2,463.50)

- Western Alliance to Expand Student Opportunities (WAESO) – Grant to support under-represented minority students in science – *The Influence of host social status on the virulence of infections agents*. Spring 2020. (\$2,463.50)
- Western Alliance to Expand Student Opportunities (WAESO) – Grant to support under-represented minority students in science – *Picking Your Poison: Evaluating Two Anticancer Chemotherapeutics Using Organismal Performance Assays (OPAs)*. Fall 2020. (\$3,463.50)
- Western Alliance to Expand Student Opportunities (WAESO) – Grant to support under-represented minority students in science – *Picking Your Poison: Evaluating Two Anticancer Chemotherapeutics Using Organismal Performance Assays (OPAs) Phase 2*. Spring 2021. (\$3,463.50)

INVITED PRESENTATIONS

- 2021 *Host MHC and genomic diversity retards experimental evolution of viral virulence*
University of Edinburgh, UK
- 2019 *Host MHC and genomic diversity retards experimental evolution of viral virulence*
Montpellier University, France
- 2018 *Host MHC and genomic diversity retards experimental evolution of viral virulence*
University of Basel, Switzerland
- 2018 *Host MHC and genomic diversity retards experimental evolution of viral virulence*
Oxford University, UK
- 2018 *A powerful new method for detecting health degradation applied to pharmaceuticals, genomic manipulations and suspected toxins*, University of Zurich, Switzerland
- 2018 *Host MHC and genomic diversity retards experimental evolution of viral virulence*
Utrecht University, Netherlands
- 2018 *Host MHC and genomic diversity dramatically retards experimental evolution of viral virulence*, University of Lausanne, Switzerland
- 2018 *A powerful new method for detecting health degradation applied to pharmaceuticals, genomic manipulations and suspected toxins*, Immunology and Medicine, University of Cambridge, UK
- 2018 *Host MHC and genomic diversity dramatically retards experimental evolution of viral virulence*, Immunology and Pathology, University of Cambridge, UK
- 2017 *Host Genetic Diversity Dramatically Retards Viral Virulence Evolution: The Genomic Basis?* Scott Edwards Think Tank for Host-Pathogen Coevolution in the Genomic Era, Gothenburg Centre of Advanced Studies in Science, Sweden
- 2017 *Influence of host and pathogen genetic diversity on viral virulence evolution*.
Tennessee State University
- 2017 *A revolution in toxicity assessment: organismal performance assays (OPAs)*. Park City Rotary.
- 2016 *Host Genetic Diversity Dramatically Retards Viral Virulence Evolution: The Genomic Basis*. University of Southern California, Los Angeles
- 2015 *Host Genetic Diversity Dramatically Retards Viral Virulence Evolution: The Genomic Basis*. Gordon Research Conference on Ecological and evolutionary genomics. Maine, USA

- 2014 *Experimental evolution of retroviral fitness and virulence across mammalian host genotypes*. University of Idaho, Moscow
- 2014 *Sugar toxicity revealed: A novel method for detecting toxicity that provides unparalleled sensitivity, breadth and adversity identification*. Park City Institute.
- 2014 *A novel method for detecting toxicity that provides unparalleled sensitivity, breadth and adversity identification: the case of added sugar*. Dixie State University.
- 2013 *Experimental evolution of retroviral fitness, virulence and trade-offs across mammalian host genotypes*. Duke University, North Carolina
- 2012 *Experimental evolution of retroviral fitness and virulence across mammalian host genotypes*, National Institute of Health, Rocky Mountain Laboratories
- 2012 *Experimental evolution of viral fitness and virulence in a mammalian host: satisfying the red queen*, Cologne Spring Meeting on Molecular Ecology and Evolution, Cologne, Germany
- 2011 *Experimental viral evolution is host genotype specific with rapid fitness and virulence increases: satisfying the red queen*, Jacques Monod conference on Coevolutionary arms race between parasite virulence and host immune defense: challenges from state of the art research, Roscoff, France
- 2010 *Immuno-diversity, pathogens and sweeteners: health consequences of pathogen evolution and dietary fructose*, Auburn University
- 2010 *MHC-dependent mating preferences*. Mate Choice Symposium. St. Louis
- 2009 *Health consequences of histocompatibility polymorphisms and using Darwin to reveal cryptic disease*. Public Symposium on Evolution and Medicine, Lausanne Switzerland
- 2008 *Health, behavior and histocompatibility genes*, Plenary speaker, Human behavior and evolution society, Kyoto Japan
- 2008 *Should we manage histocompatibility genetic variation in threatened species?* Workshop on "Managing adaptive genetic variation in conservation biology", LaFouly, Switzerland
- 2008 *Cryptic health degradation and failure rates during reintroduction of captive-bred threatened species*. Workshop on "Managing adaptive genetic variation in conservation biology", LaFouly, Switzerland
- 2007 *MHC genes cause disease: what good are bad genes?* ARUP Laboratories, Utah
- 2006 *Pathogens, mutations, sexual selection and histocompatibility polymorphisms*. University of Kentucky
- 2005 *Functional significance of MHC-mediated recognition systems*, Institut für Immunogenetik, Humboldt University, Berlin, Germany
- 2005 *The functional significance of MHC mediated odors*, Symposium on *Odor signals from the immune system: how the nose detects genetic individuality*, Association for Chemoreception Sciences, Sarasota, Florida
- 2005 *Pathogens, mutations, sexual selection and histocompatibility polymorphisms*. Purdue University
- 2004 *Why do disease-causing histocompatibility alleles persist?* University of Chicago
- 2003 *Ecological approaches for characterizing gene function*, Symposium on *Genes in ecology, ecology in genes*, Kansas City

- 2003 *Using ecology to reveal gene function*. Gordon Research Conference on *Evolutionary and Ecological Functional Genomics: Finding the Genes that Matter*, New London, New Hampshire
- 2003 *Pathogen-mediated selection acting on histocompatibility genes*. Symposium on *Evolutionary Dynamics of the Major Histocompatibility Complex*, European Society for Evolutionary Biology Congress, Leeds UK
- 2002 *Pathogens, mutations, sexual selection and MHC diversity, Epilogue: ecological functional genomics*, Dept. of Genetics, University of Georgia
- 2002 *MHC-mediated immune/kin/self recognition reduces social, parasite and mutational loads*, Symposium on Ecological implications of self / non-self recognition, Ecological Society of America, Tucson
- 2001 *Pathogens, mutational load, sexual selection and MHC diversity, Epilogue: ecological functional genomics and phenotrons*, University of Missouri, St. Louis
- 2001 *MHC polymorphism is a consequence of microbial pressure*, Current Controversies Plenary Debate with Professor Jonathon Howard (moderated by Professor Peter Parham) at the 11th International Congress of Immunology, Stockholm
- 2001 *Diversifying and diversity maintaining selection acting on MHC genes*, International Colloquium on Modeling Immune Systems, Amsterdam
- 2001 *Evolution of genetic diversity at histocompatibility genes: pathogens, mutational load and sexual selection*, University of Turku, Finland
- 2001 *Ecological functional genomics: using real ecology to reveal real function*, Symposium on Evolutionary and Ecological Functional Genomics, Knoxville
- 2001 *Evolution of diversity at histocompatibility genes: pathogens, mutational load and sexual selection*, University of Nevada, Reno
- 2000 *Histocompatibility gene diversity and disease: experiments with Salmonella, Theiler's virus and inbreeding*, University of Texas, Southwestern Medical Center
- 2000 *Evolution of diversity at histocompatibility genes: pathogens, mutations and sexual selection*, Brigham Young University
- 2000 *Histocompatibility genes and disease: experiments with Salmonella, Theiler's virus and inbreeding*, Kansas State University
- 1999 *Recognizing kin recognition and Does MHC-mediated mate choice function to avoid inbreeding or enhance disease resistance in offspring?* Workshop on: Relatedness: concept, measure and evolutionary implications. LaSage, Switzerland
- 1999 *Is histocompatibility-mediated sexual selection for disease resistance or outbreeding*, Workshop on: Life history, immunocompetence and parasites, University of Neuchatel, Switzerland
- 1999 *Parasites, sexual selection, outbreeding and histocompatibility genes*, Humboldt State University
- 1998 *Testosterone, MHC 'knockouts', immunocompetence and social status*, University of Nebraska
- 1998 *Evolution of MHC genetic diversity: parasites, mutational load and sexual selection*, University of Oregon, Eugene

- 1998 *Evolution of MHC genetic diversity: parasites, mutational load and sexual selection*, University of California, Riverside
- 1997 *MHC, sexual selection and immunocompetence* - Plenary Speaker, International Ethological Conference, Vienna, Austria
- 1997 *Cross-fostering reverses MHC disassortative mating preferences* - Vth International workshop on the evolution of the major histocompatibility complex, Visby, Sweden
- 1996 *Fitness and behavioral consequences of MHC class I deficiency in seminatural populations of *Mus musculus** - International symposium on: MHC and behavior, Kiel, Germany
- 1996 *The evolution of MHC genetic diversity*, University of California, Irvine
- 1996 *The evolution of MHC genetic diversity*, City of Hope Medical Center, Duarte, California
- 1995 *The nature of selection operating against MHC class I deficient mice (β_2 microglobulin "knockouts") in seminatural populations* - IVth International workshop on the evolution of the major histocompatibility complex, St. Augustine
- 1995 *Pathogen evasion of MHC-dependent immune recognition* - NSF sponsored workshop on: The Biology of Recognition Systems - University of California, Davis
- 1995 *Molecular ecology of MHC genetic diversity: PCR-based cloning, genotyping variants, MHC "knockouts" and the renaissance biologist* - American Society of Zoologists Symposium on: Molecular approaches to zoology and evolution - St. Louis
- 1994 *The evolution of MHC-associated sexual selection* - Royal Society Symposium on: Infection, Polymorphism and Evolution, London
- 1994 *Evolution of genetic incompatibility and histocompatibility systems* - Sewall Wright Seminar Series, University of Chicago
- 1993 *The evolution of MHC genetic diversity: a tale of incest, pestilence and sexual preference* - IIIrd International workshop on the evolution of the major histocompatibility complex, Cambridge (UK)
- 1993 *MHC, infectious disease and kin recognition*, Smithsonian and National Zoo
- 1992 *Disease, inbreeding, kin recognition and MHC genetic diversity* - 8th international H-2/HLA cloning workshop - Jekyll Island
- 1992 *MHC and kin recognition*, Rice University
- 1991 *Strong MHC-based mating preferences in semi-natural populations of *Mus*: evidence that they function primarily to avoid inbreeding* - Symposium on: The major histocompatibility complex, olfaction and behavior - Chemical Signals in Vertebrates VI, Philadelphia
- 1991 *Functional significance of MHC genetic diversity* - NATO Conference on MHC evolution, Miami
- 1991 *MHC-based mating preferences in *Mus* are strong and may function to avoid inbreeding* - Workshop on MHC structure and function - FASEB, Atlanta
- 1991 *Population and evolutionary genetics of MHC genes* - Purdue University
- 1990 *The maintenance of MHC genetic diversity: disease or genetic incompatibility?* - Vassar College

- 1989 *The maintenance of MHC genetic diversity: disease resistance, inbreeding depression, and reproduction* - Kansas State University
- 1988 *Maintenance of MHC polymorphism in Mus: male heterozygote advantage and disassortative reproductive selection* - Symposium on Parasites and sexual selection - American Society of Zoologists - San Francisco
- 1987 *Can heterozygote advantage account for the maintenance of MHC polymorphisms* - International symposium on H-2 gene complex: genes, molecules, function - Bar Harbor

PUBLICATIONS

- 2021 Cornwall DH, Ruff JS, Zachary ER, Young CP, Maguire KM, Painter RJ, Trujillo SM, **Potts** WK. Horizontal transmission of a murine retrovirus is driven by males within semi-natural enclosures. *Functional Ecology*. First published: 02 February 2021.
- 2020 Cauceglia JW, Nelson AC, Rubinstein ND, Kukreja S, Sasso LN, Beaufort JA, Rando OJ, **Potts** WK. Transitions in paternal social status predict patterns of offspring growth and metabolic transcription. *Mol Ecol*. 2020 Feb;29(3):624-638. doi: 10.1111/mec.15346. Epub 2020 Jan 19. PMID: 31885115.
- 2020 Cooper AN, Cunningham CB, Morris JS, Ruff JS, **Potts** WK, Carrier DR. Musculoskeletal mass and shape are correlated with competitive ability in male house mice (*Mus musculus*). *J Exp Biol*. 2020 Feb 7;223(Pt 3). pii: jeb213389. doi: 10.1242/jeb.213389. PMID: 31915200
- 2018 Cornwall D.H., Kubinak J.L., Zachary E., Stark D.L., Seipel D., **Potts** W.K. Experimental manipulation of population-level MHC diversity controls pathogen virulence evolution in *Mus musculus*. *J Evol Biol*. 31:314-322. doi: 10.1111/jeb.13225. Epub 2018 Jan 12. PMID: 29266576
- 2017 Ruff J.S., Saffarini R.B., Ramoz L.L., Morrison L.C., Baker S., Lavery S.M., Tvrdik P., Capecchi M.R., **Potts** W.K. Mouse fitness measures reveal incomplete functional redundancy of Hox paralogous group 1 proteins. *PLoS One*. 12(4):e0174975. doi: 10.1371/journal.pone.0174975. eCollection 2017. PMID: 28380068.
- 2017 Morris J.S., Ruff J.S., **Potts** W.K., Carrier D.R. A disparity between locomotor economy and territory-holding ability in male house mice. *J. Exp. Biol*. 220:2521-2528. doi: 10.1242/jeb.154823. Epub 2017 May 3. PMID: 28468871.
- 2017 Ruff, J.S., Cornwall, D.H, Morrison, L.C., Cauceglia, J.W., Nelson, A.C., Gaukler, S.M, Meagher, S.M., Carroll, L.S., and **Potts**, W.K. Sexual selection constrains the body mass of male but not female mice. *Ecol. Evol*. 7:1271-1275. doi: 10.1002/ece3.2753. PMID: 28303195 (cover photo article, Jan. 27 issue)
- 2016 Mowry, A., Kavazis, A. Sirman, W. Potts, W. R. Hood. Reproduction Does Not Adversely Affect Liver Mitochondrial Respiratory Function but Results in Lipid Peroxidation and Increased Antioxidants in House Mice. *PLoS ONE* 11(8): e0160883. doi:10.1371/journal.pone.0160883
- 2016 Gaukler, S.M., Ruff, J.S., Morrison, L.C. & **Potts**, W.K. Rofecoxib-induced deleterious effects escape detection by organismal performance assays. *J of Negat Pharm Results*. 8:4-11. [10.4103/0976-9234.177051](https://doi.org/10.4103/0976-9234.177051)
- 2015 Gaukler, S.M., Ruff, J.S., Galland, T., Kandar, K.A., Underwood, T.K., Liu, N.M., Young, E.L., Morrison, L.C., Yost, G.S., Potts, W.K. Low-dose paroxetine

- exposure causes lifetime declines in male mouse body weight, reproduction and competitive ability as measured by the novel organismal performance assay. *Neurotoxicol. Teratol.* 47:46-53. doi: 10.1016/j.ntt.2014.11.002.
- 2015 Kubinak, J.L., W. Z. Stephens, R. Soto, C. Petersen, T. Chiaro, L.G., R. Bell, N.J. Ajami, J.F. Petrosino, L. Morrison, W.K. **Potts**, P.E. Jensen, R.M. O'Connell & J.L. Round. MHC variation sculpts individualized microbial communities that control enteric infection. *Nature Communications*. 6:8642. doi: 10.1038/ncomms9642. PMID:26494419
- 2015 Ruff, J.S., Saffarini, R.B., Ramoz, L.L., Morrison, L.C., Baker, S., Lavery, S.M., Tvrdik, P. & **Potts**, W.K. Fitness assays reveal incomplete functional redundancy of the HoxA1 and HoxB1 paralogs of mice. *Genetics* 201: 727-736. doi: 10.1534/genetics.115.178079
- 2015 Zala, S.M., A. Bilak, M. Perkins, W. K. **Potts** and D. J. Penn. Female house mice initially shun infected males, but do not avoid mating with them. *Behavioral Ecology and Sociobiology*. 69: 715-722. doi: 10.1007/s00265-015-1884-2
- 2015 Nelson, A.C, C. Cunningham, J.S. Ruff, W.K. **Potts**. Protein pheromone expression levels predict and respond to the formation of social dominance networks. *Journal of Evolutionary Biology*. 28: 1213–1224. doi: 10.1111/jeb.12643.
- 2015 Ruff, J.S., S. Hugentobler, M. Sosa, A. Suchy, R. Tanner, S.H. Gieng, M. Shigenaga, W. K. **Potts**. Dietary fructose and glucose monosaccharides increase mortality of female mice compared to sucrose. *Journal of Nutrition*, 145:434-41. doi: 10.3945/jn.114.202531
- 2015 Gaukler, S.M., J.S. Ruff, T. Galland, K.A. Kandarlis, T.K. Underwood, N.M. Liu, E.L. Young, L.C. Morrison, G.S. Yost, W.K. **Potts**. Low-dose paroxetine exposure causes lifetime declines in male mouse body weight, reproduction and competitive ability as measured by the novel organismal performance assay. *Neurotoxicology and teratology*. 47:46-53. doi: 10.1016/j.ntt.2014.11.002
- 2014 Kubinak, J.L., Douglas H. Cornwall, Frederick R. Adler, Kim J. Hasenkrug and W.K. **Potts**. Serial infection of diverse host (*Mus*) genotypes rapidly impedes pathogen fitness and virulence. *Proceedings of the Royal Society of London B*. 282:1798:20141568. doi: 10.1098/rspb.2014.1568
- 2013 Nelson, A.C., J. W. Cauceglia, S.D. Merkley, N.A. Youngson, A.J. Oler, R.J. Nelson, B.R. Cairns, E. Whitelaw, W.K. **Potts**. Reintroducing domesticated wild mice to sociality induces adaptive transgenerational effects on MUP expression. *Proceedings of the National Academy of Sciences USA*. 110:19848–19853. doi: 10.1073/pnas.1310427110
- 2013 Ruff, J.S., A. Suchy, S. Hugentobler, M. Sosa, B. Schwartz, S.H. Gieng, M. Shigenaga, W.K. **Potts**. Human-relevant levels of fructose decrease mouse competitive ability, survival and fitness. *Nature Communications*. 4:2245 doi: 10.1038/ncomms3245.
- 2013 Kubinak, J.L., J.S. Ruff, C.W. Hyzer, P.R. Slev, W.K. **Potts**. MHC versus non-MHC as the primary target of pathogen adaptation. *Genes and immunity*. 14:365-372. doi: 10.1038/gene.2013.27.
- 2013 Kubinak, J.L., W.K. **Potts**. Host resistance influences patterns of experimental viral adaptation and virulence evolution. *Virulence*. 4:410-418.

- doi: 10.4161/viru.24724.
- 2013 Nelson, A.C., K.E. Colson, S. Harmon, W.K. **Potts**. The role of sexual selection during rapid adaptation to a socially competitive environment. *BMC Evolutionary Biology*. 13:81-95. doi: 10.1186/1471-2148-13-81.
- 2013 McClelland, E.E., L.M. Hobbs, J. Rivera, A. Casadevall, W.K. **Potts**, J.M. Smith, J.J. Ory. The Role of Host Gender in the Pathogenesis of *Cryptococcus neoformans* Infections. *PLOS ONE*. 8:e63632. doi: 10.1371/journal.pone.0063632.
- 2013 Cunningham, C.B., Ruff, J.S., Chase, K., **Potts**, W.K. and Carrier, D.R. Competitive ability in male house mice (*Mus musculus*): genetic influences. *Behavioral Genetics*. 43:151-60. doi: 10.1007/s10519-012-9577-3.
- 2012 Kubinak, J.L., J.S. Ruff, C.W. Hyzer, P.R. Slev, and W.K. **Potts**. Experimental viral evolution to specific host MHC genotypes reveals fitness and virulence tradeoffs in alternative MHC types. *Proceedings of the National Academy of Sciences USA*. 28;109(9):3422-7. doi: 10.1073/pnas.1112633109. (Cover photo article, 28 Feb. issue)
- 2012 Kubinak, J.L., Nelson, A.C., Ruff, J.S., & **Potts** W.K. "Tradeoffs limiting MHC heterozygosity" In Demas, G.E. & Nelson, R.J. (Eds.), *Ecological Immunology*. New York, NY: Oxford University Press.
- 2012 Ruff, J.S., Nelson A.C., Kubinak, J.L., & **Potts** W.K. MHC signaling during social communication. *Adv Exp Med Biol*. 738:290-313. doi: 10.1007/978-1-4614-1680-7_17.
- 2008 Ilmonen, P., K. Damjanovich, J. Clarke, D. Lamborn, L. Morrison, L. Ghotbi, D.J. Penn, and W.K. **Potts**. Experimental infection magnifies inbreeding depression in house mice. *J. Evol. Biol.* 21:834-841. doi: 10.1111/j.1420-9101.2008.01510.x.
- 2008 Zala S.M., B.K. Chan, S.D. Bilbo, W.K. **Potts**, R.J. Nelson, D.J. Penn. Genetic resistance to infection influences a male's sexual attractiveness and modulation of testosterone. *Brain, Behavior, and Immunity* 22:381-387. doi: [10.1016/j.bbi.2007.09.003](https://doi.org/10.1016/j.bbi.2007.09.003)
- 2008 Zala, S.M., W.K. **Potts**, D.J. Penn. Exposing males to female scent increases the cost of controlling *Salmonella* infection in wild house mice. *Behavioral Ecology and Sociobiology* 62:895–900. doi: 10.1007/s00265-007-0513-0
- 2007 Ilmonen, P., D.J. Penn, K. Damjanovich, L. Morrison, L. Ghotbi, W.K. **Potts**. Major histocompatibility complex heterozygosity reduces fitness in experimentally infected mice. *Genetics* 176:2501-2508. DOI: 10.1534/genetics.107.074815
- 2007 Carroll, L.S. and W.K. **Potts**, Sexual selection: using social ecology to determine fitness differences. In: "Rodent Societies: *An Ecological and Evolutionary Perspective*". (J.O. Wolff, P.W. Sherman, Ed.). University of Chicago Press, Chicago. Pp. 57-67.
- 2006 Carroll, L.S. and W.K. **Potts**. Functional genomics requires ecology. *Advances in the Study of Behavior* 36:173-215
- 2006 Slev, P. R., A.C. Nelson, W.K. **Potts**. Sensory neurons with MHC-like peptide binding properties: disease consequences. *Curr Opin Immunol* 18: 608-16. doi:[10.1016/j.coi.2006.07.012](https://doi.org/10.1016/j.coi.2006.07.012)

- 2005 McClelland, E.E., W.T. Perrine, W.K. **Potts** and A. Casadevall. Relationship of virulence factor expression to evolved virulence in mouse-passaged *Cryptococcus neoformans* lines. *Infection and Immunity* 73:7047-7059
doi: [10.1128/IAI.73.10.7047-7050.2005](https://doi.org/10.1128/IAI.73.10.7047-7050.2005)
- 2004 McClelland E.E., F.R. Adler, D.L. Granger and W.K. **Potts**. Major histocompatibility complex controls the trajectory but not host-specific adaptation during virulence evolution in the pathogenic fungus, *Cryptococcus neoformans*. *Proceedings of the Royal Society Lond. B Biol. Sci.* 271:1557-64.
doi:[10.1098/rspb.2004.2736](https://doi.org/10.1098/rspb.2004.2736)
- 2004 Carroll, L., S. Meagher, L. Morrisson, D. Penn W.K. **Potts**. Fitness effects of a selfish gene are revealed in an ecological context. *Evolution* 58:1318-1328.
- 2004 Zala, S.M., W.K. **Potts**, D.J. Penn. Scent-marking displays provide honest signals of health and infection. *Behavioral Ecology* 15:338-344.
- 2004 McClelland, E.E., K. Damjanovich, K. Gardner, Z.J. Groesbeck, M.S. Ma, M. Nibley, K.S. Richardson, M. Wilkinson, L.C. Morrison, P. Bernhardt, W.K. **Potts**. Infection-dependent phenotypes in MHC-congenic mice are not due to MHC: can we trust congenic animals? *BMC Immunology* 5:14.
- 2003 McClelland, E.E, D. Granger, W.K. **Potts**. Histocompatibility genes influence susceptibility in *Cryptococcus neoformans* infections. *Infection and Immunity* 71:4815-4817.
- 2003 McClelland, E.E., D.J. Penn, W.K. Potts. Major Histocompatibility Complex heterozygote superiority during coinfection. *Infection and Immunity* 71:2079–2086.
- 2002 Slev, P.R., W.K. **Potts**. Disease consequences of pathogen adaptation. *Current Opinion in Immunology* 14:609-614.
- 2002 Penn, D.J., K. Damjanovich, W.K. **Potts**. MHC-heterozygosity confers a selective advantage against multiple-strain infections. *Proc. Nat. Acad. Sci.* 99:11260-11264.
- 2002 Carroll, L.S., D. Penn, W.K. **Potts**. Discrimination of MHC derived odors by untrained mice is consistent with divergence in peptide-binding region residues. *Proc. Nat. Acad. Sci.* 99:2187-2192.
- 2002 **Potts**, W.K. Wisdom through immunogenetics. *Nature Genetics* (News & Views). 30:130-131.
- 200 Leamy, L.J., S. Meagher, S. Taylor, L. Carroll, W. K. **Potts**. Size and fluctuating asymmetry of morphometric characters in mice: their associations with inbreeding and *t*-haplotype. *Evolution* 55: 2333–2341.
- 2001 Carroll, L.S., W.K. **Potts**. Accumulated background variation among H2 mutant congenic strains: elimination through PCR-based genotyping of F2 segregants. *J. Immunol. Meth.* 257:137-143.
- 2000 Meagher S., D.J. Penn, and W.K. **Potts**, Male-male competition magnifies inbreeding depression in wild house mice. *Proc. Nat. Acad. Sci.* 97:3324-3329.
- 2000 Brockmann, H.J., C. Nguyen, W.K. **Potts**. Paternity in horseshoe crabs when spawning in multiple male groups. *Animal Behaviour* 60:837-849.
- 1999 Penn, D. W.K. **Potts**. The evolution of mating preferences and major histocompatibility complex genes. *American Naturalist*, 153:145-164.

- 1999 McDonald, D.B., W.K. **Potts**, J.W. Fitzpatrick, and G.E. Woolfenden. Contrasting genetic structures in sister species of North American scrub-jays. *Proc. Royal Soc. London B*. 266: 1117-1125.
- 1998 Penn, D., W.K. **Potts**. Chemical signals and parasite-mediated sexual selection. *Trends in Ecology and Evolution* 13:391-396.
- 1998 Penn, D., W.K. **Potts**. Wild house mice distinguish MHC-determined odors without training. *Physiology and Behavior* 64:235-243.
- 1998 Penn, D., W.K. **Potts**. MHC-disassortative mating preferences reversed by cross-fostering. *Proceedings of the Royal Society of London B* 265:1299-1306.
- 1998 Penn, D., G. Schneider, K. White, P.R. Slev, W.K. **Potts**. Female mice (*Mus musculus domesticus*) prefer the odor of uninfected males over males infected with influenza viruses. *Ethology* 104:685-694.
- 1998 Penn, D., W.K. **Potts**. The influence of major histocompatibility (MHC) genes on odor and mating preferences. *Advances in Immunology* 69:411-436.
- 1997 Meagher, S., W.K. **Potts**. A microsatellite-based MHC genotyping system for house mice (*Mus*). *Hereditas* 127:75-82.
- 1997 McDonald, D.B., W.K. **Potts**. DNA microsatellites as genetic markers at several scales. pp. 29-50. *In: Avian molecular evolution and systematics*. D.P. Mindell ed. Academic Press, San Diego.
- 1997 Apanius, V., Penn, D., Slev, P.R., Ruff, L.R. **Potts**, W.K. The nature of selection on the major histocompatibility complex. *Critical Reviews in Immunology* 17:179-224.
- 1996 Edwards, S.V., W.K. **Potts**, Polymorphism of genes in the major histocompatibility complex: implications for conservation genetics of vertebrates. *In: Molecular genetic approaches in conservation*. T.B. Smith and R.K. Wayne eds. Oxford University Press, Oxford.
- 1996 **Potts**, W.K. PCR-based cloning across large taxonomic distances and polymorphism detection: MHC as a case study. pp. 181-194. *In: Molecular Zoology: Advances, Strategies and Protocols*. J.D. Ferraris and S.R. Palumbi eds. John Wiley & Sons, Inc. NY, NY.
- 1995 Edwards, S.E., Wakeland, E.K., **Potts**, W.K. Contrasting histories of MHC evolution in birds and mammals. *Proc. Nat. Acad. Sci.* 92:12200-12204.
- 1995 Edwards, S.E., Grahn, M., **Potts**, W.K. Dynamics of MHC evolution in birds and crocodylians: amplification of class II genes with degenerate primers. *Molecular Ecology* 4:719-729.
- 1995 **Potts**, W.K. and Slev, P.R. Pathogen-based models favoring MHC genetic diversity. *Immunological Reviews* 143:181-197.
- 1995 Manning, C.J., Wakeland, E.K., Dewsbury, D.A. and **Potts**, W.K. Communal nesting and communal nursing in housemice, *Mus musculus domesticus*. *Animal Behavior* 50:741-751.
- 1994 **Potts**, W.K., Manning, C.J., Wakeland, E.K. The role of infectious disease, inbreeding and mating preferences in maintaining MHC genetic diversity: an experimental test. *Phil. Trans. Roy. Soc. Lond.* 346:369-378.
- 1994 McDonald, D.B., **Potts**, W.K. Cooperative display and relatedness among males in a lek-mating bird. *Science* 266:1030-1032. (Cover photo article, 11 Nov. issue)

- 1994 Brockmann, H.J., Colson, T., **Potts**, W.K. Sperm competition in Horseshoe Crabs (*Limulus polyphemus*). *Behavioral Ecology and Sociobiology* 35:153-160.
- 1993 **Potts**, W.K., E.K. Wakeland. The evolution of MHC genetic diversity: a tale of incest, pestilence, and sexual preference. *Trends in Genetics* 9:408-412.
- 1992 **Potts**, W.K., Manning, C.J., Wakeland, E.K. MHC-based mating preferences in *Mus* operate through both settlement patterns and female controlled extra-territorial matings. *In: Chemical Signals in Vertebrates VI*. pp. 183-188. R. Doty, ed. Plenum Press, New York.
- 1992 Manning, C.J., **Potts**, W.K., Wakeland, E.K., Dewsbury, D.A. What's wrong with MHC mate choice experiments? pp. 229-236. *In: Chemical Signals in Vertebrates VI*. R. Doty, ed. Plenum Press, New York.
- 1992 Manning, C.J., Wakeland, E.K., **Potts**, W.K. Communal nesting patterns in mice implicate MHC genes in kin recognition. *Nature* 360:581-583.
- 1992 **Potts**, W.K., Manning, C.J., Wakeland, E.K. Sexual selection and MHC genes. *Nature* 356:293-294 (Scientific Correspondence).
- 1991 **Potts**, W.K., Manning, C.J., Wakeland, E.K. Mating patterns in semi-natural populations of mice influenced by MHC genotype. *Nature* 352:619-621.
- 1991 **Potts**, W.K., Manning, C.J., Wakeland, E.K. The evolution of MHC-based mating preferences in *Mus*. *In: Molecular Evolution of the Major Histocompatibility Complex*. J. Klein and D. Klein, eds. pp. 421-434. Springer-Verlag, Heidelberg.
- 1990 **Potts**, W.K., Wakeland, E.K. Evolution of diversity at the major histocompatibility complex. *Trends in Ecology and Evolution* 5:181-187.
- 1990 **Potts**, W.K., Wakeland, E.K. The maintenance of MHC polymorphism. *Immunology Today* 11:39-40.
- 1990 Pullen, A.M., **Potts**, W., Wakeland, E.K., Kappler, J., Marrack, P. Surprisingly uneven distribution of the T cell receptor V β repertoire in wild mice. *J. Experimental Medicine* 171:49-62.
- 1990 Wakeland, E.K., Boehme, S., She, J.X., Lu, C.C., McIndoe, R.A., Cheng, I., Ye, Y. **Potts**, W.K.: Ancestral Polymorphisms of MHC class II genes: Divergent allele advantage. *Immunologic Research* 9:123-131.
- 1989 Pullen, A., Wakeland, E., **Potts**, W., Kappler, J.W., Marrack, P. The advantage of limiting the T-cell repertoire for antigen and MHC. pp.199-205, *In: Molecular Biology and Autoimmune Disease*. NATO ASI Series Vol. 38. Demaine, A.G., Banga, J.P., McGregor, A.M. eds. Springer-Verlag, Berlin.
- 1989 Marrack, P., Pullen, A.M., Herman, A., Callahan, J., Choi, Y., **Potts**, W., Wakeland, E., Kappler, J.W. T Cell Receptors. *Progress in Immunology VII*:3-12.
- 1989 Kappler, J.W., Pullen, A.M., Callahan, J., Choi, Y., Herman, A., White, J., **Potts**, W., Wakeland, E.K., Marrack, P.: Consequences of self and foreign superantigen interaction with specific V β elements of the murine β Tcr. *Cold Spring Harbor Symposia in Quantitative Biology* 54:401-408.
- 1988 **Potts**, W.K., Manning, C.J., Peck, A.B., Price-LaFace, M., Wakeland, E.K.. Can heterozygote advantage account for the maintenance of MHC polymorphisms. pp. 89-102, *In: H-2 Antigens: Genes, Molecules, Function*. C.S. David, ed. Plenum Press, New York.

- 1988 Wakeland, E.K., R.W. Tarnuzzer, C.Lu, W.K. **Potts**, R.A. McIndoe, W.S. Talbot, T.J. McConnell. The evolution of MHC class II genes within the genus *Mus*. pp. 139-153, *In H-2 antigens: genes, molecules, function*, C.S. David (ed.), Plenum Press, New York.
- 1986 **Potts**, W.K. The evolution of reproductive mechanisms that control progeny genotype: experimental studies with *Rattus norvegicus*. Ph.D. dissertation. University of Washington, Seattle.
- 1984 **Potts**, W.K. The chorus line hypothesis of maneuver coordination in avian flocks. *Nature* 309:344-345. (Cover photo article, 24 May issue)
- 1984 Hoffman, S.W., W.K. **Potts**. Fall migration of Golden Eagles in the Wellsville Mountains, Northern Utah, 1976-1979. pp. 207-218. *In: Proceedings of Hawk Migration Conference IV*. M. Harwood ed. Hawk migration association of North America.
- 1981 Vanderwall, S.B., S.W. Hoffman, W.K. **Potts**. Emigration behavior of Clark's Nutcracker. *Condor* 83:162-170.
- 1979 **Potts**, W.K., T. Sordahl. The gong method for capturing shorebirds and other ground-roosting species. *North American Bird Bander* 4:106-107.

MANUSCRIPTS SUBMITTED OR IN PREPARATION

- Middlebrook, E.A., D. Stark, D. Cornwall, J.L. Kubinak, W.K. **Potts**. Deep sequencing of MHC-adapted viral lines reveal complex recombinational exchanges with endogenous retroviruses leading to high-frequency variants. *Frontiers in Immunology*
- Potts**, W.K. Distress scream behavior in *Passer domesticus*. *Journal of Field Ornithology*.

TEACHING

- 1996 - 97 - Molecular Evolution Laboratory (Biol 3125)
- 1997- 98 - Molecular Evolution Laboratory (Biol 3125)
- 1998 - 99 - Behavioral Ecology (Biol 3430); Graduate Core Seminar, *Host-parasite coevolution* (Biol 780)
- 1999 – 2000 - Behavioral Ecology (Biol 3430)
- 2000 – 01 - Molecular Evolution Laboratory (Biol 3125); Graduate Core Seminar, *Experimental Evolution* (Biol 7406)
- 2001 – 02 - Behavioral Ecology (Biol 3430)
- 2002 – 03 - Molecular Evolution Laboratory (Biol 3125)
- 2003 – 04 - Behavioral Ecology (Biol 3430)
- 2004 – 05 - Molecular Evolution Laboratory (Biol 3125)
- 2005 – 06 - Behavioral Ecology (Biol 3430); Graduate Core Seminar, *Antagonistic coevolution* (Biol 7406)
- 2006-2007 - Molecular Evolution Laboratory (Biol 3125)
- 2007-2008 - Behavioral Ecology (Biol 3430)
- 2008-2009 - Molecular Evolution Laboratory (Biol 3125)
- 2009-2010 - Behavioral Ecology (Biol 3430)
- 2010 - 2011 - Molecular Evolution Laboratory (Biol 3125)

2011-2012 - Behavioral Ecology (Biol 3430); Advanced topics in ecology and evolution
(Biology 7964) (coordinator)
2012-2013 - Molecular Evolution Laboratory (Biol 3125)
2013-2014 - Behavioral Ecology (Biol 3430)
2014-2015 - Molecular Evolution Laboratory (Biol 3125)
2015-2016 - Behavioral Ecology (Biol 3430)
2017-2018 - Molecular Evolution Laboratory (Biol 3125)
2018-2019 – Sabbatical to Cambridge University, UK
2019-2020 – Molecular Evolution Laboratory (Biol 3125) and Fundamentals of Biology
II (Biol 1620)
2020-2021 -- Behavioral Ecology (Biol 3430)and Fundamentals of Biology II (Biol
1620)

Over 184 undergraduate students have been research assistants in my laboratory. I have served as a member of Ph.D. graduate committees for the following graduate students:

David Witherspoon
Rachael Lee
Devin Drown
Janice Ragsdale
Jen Sorensen
Michelle Lefevbre
Dustin Penn (chair)
Lara Carroll (chair)
Andy Pacejka (co-chair)
Brad Demarest
Erin McClelland (chair)
Sarah Zala
Christine Turnbull
Lisa Kelley (chair)
Ann-Marie Torregrossa
Brendan O'Fallon
Adam Nelson (chair)
Jason Kubinak (chair)
James Ruff (chair)
Chris Cunningham
Silvia Smith
Patrick Ely
Jessica Waite
Jennifer Koop
Abhishek Chari
Sarah Knutie
Shannon Gaukler (chair)
Earl Middlebrook (chair)
Doug Cornwall (chair)
Jeremy Morris
Rodrigo Costa (Chair)

Sabrina Mcnew
Derek Stark (Chair)
Alexander Horn
Joseph Cauceglia (Chair)

TRAINEES

- Shannon Gaukler, Ph.D., University of Utah, 2014. Shannon accepted a Post-Doctoral Research Associate position at Los Alamos National Laboratory.
- James Ruff, Ph.D., Biology, University of Utah, 2012. James accepted a teaching position at Westminster College for 1 ½ years. He then returned to accept a post-doctoral position in my lab.
- Adam Nelson, Ph.D., Biology, University of Utah, 2011. Adam conducted his dissertation work in my laboratory. He accepted an HHMI postdoctoral fellowship at Harvard University in the laboratory of Catherine Dulac.
- Jason L. Kubinak, Ph.D., Biology, University of Utah, 2011. Jason conducted his dissertation work in my laboratory. He accepted a postdoctoral fellowship at Boston University in the laboratory of Thomas Kunz, but tragically the lab shutdown due to a unfortunate accident to Thomas Kunz. Jason then accepted a postdoctoral position in June Round's lab in the Dept. of Pathology at the Univ. of Utah. He accepted an assistant professor position at University of Texas at Arlington and now has moved as an assistant professor to the University of South Carolina Medical School.
- Erin M. McClelland, Ph.D. Biology, University of Utah, 2004. Erin conducted her Ph.D. work in my laboratory and her post-doctoral fellowship in Arturo Casadevall's laboratory at the Albert Einstein College of Medicine. In 2008 she accepted an Assistant Professor position at the Commonwealth Medical College in Scranton, PA. She is currently an associate professor at the University of Middle Tennessee.
- Petteri Ilmonen, Ph.D. Biology, University of Turku, Finland. Petteri conducted post-doctoral studies in my laboratory between March 2002 and December 2003. Petteri accepted a post-doctoral fellowship at the Konrad Lorenz Institute in Vienna in 2004.
- Dustin J. Penn, Ph.D. Biology, University of Utah, 1997. Dustin conducted his Ph.D. work in my laboratory as well as his post-doctoral work. He accepted the Directorship of the Konrad Lorenz Institute in Vienna, Sept. 2002.
- Lara S. Carroll, Ph.D. Biology, University of Utah, 2002. Lara conducted her Ph.D. work in my laboratory and is currently a Howard Hughes Postdoctoral Fellow with Dr. Mario Capecchi, University of Utah.
- Nigella Hillgarth, Ph.D. Zoology, Oxford University. Nigella joined my laboratory as a postdoctoral fellow in 1997. We were awarded an NSF grant to study mechanisms of androgen-mediated immunocompetence in mice. She accepted a position as Director of the Tracy Aviary in 1999, while maintaining her position as Research Assistant Professor at the University of Utah. She accepted a position at the Scripps Institute for Oceanography as Executive Director of the Birch Aquarium at Scripps in 2002. This is a senior administrative position at both Scripps and the University of California at San Diego.

- Shawn Meagher, Ph.D. Zoology, University of Michigan, 1995. Shawn received an NSF postdoctoral award to study the immunogenetics and parasitology of natural populations of *Peromyscus*. Shawn joined the lab in July, 1995 and accepted an assistant professor position at Western Illinois University in 1999.
- Scott V. Edwards, Ph.D., Zoology, University of California, Berkeley, 1992 (with Dr. Alan Wilson). Scott was a Sloan Fellow in Molecular Evolution in my laboratory and accepted a position as Assistant Professor in the Department of Zoology at the University of Washington starting Jan. 1 1995. In 2004 Scott accepted a position at Harvard University as Professor of Biology.
- C. Jo Manning, Ph.D., Psychology, University of Washington, 1993 (with David Barash). Jo conducted her Ph.D. research at the University of Florida in a collaborative study that used our seminatural populations of wild mice. Jo spent a short period of time in my lab as a postdoctoral fellow in 1994. She accepted a position as an assistant professor in the Department of Psychology at the University of Nebraska (Omaha) in 1996.
- Mats Grahn, Ph.D., Animal Ecology, Lund University (Sweden), 1992 (with Dr. Torbjorn von Schantz). Mats was a postdoctoral fellow with support from the Swedish government. Mats accepted a faculty position at the University College of South Stockholm in 1998.
- David McDonald, Ph.D., Biology, University of Arizona, 1986 (with Astrid Kodric-Brown). David has primarily been a collaborator on avian microsatellite and MHC studies, although he did receive his molecular genetics training in my laboratory. David accepted an assistant professor position at the University of Wyoming in 1996.
- Victor Apanius, Ph.D., Biology, University of Pennsylvania, 1991 (with Dr. Robert Ricklefs). Victor's three year NSERC fellowship started in January of 1994. He is conducting a collaborative project between my laboratory and Dr. Marilyn Scott's laboratory at the Institute of Parasitology, McGill University. The project involves experimental infections of a mouse nematode (*Heligmosmoides polygyrus*) known to have MHC-dependent susceptibilities. Victor arrived in Gainesville in Oct. 1994. Victor accepted an assistant professor position at Florida International University (Miami) in 1996.
- Ramelle Ruff, Ramelle received her MS degree at the University of Florida in 1997 under my mentorship. She started a PhD program in marine mammalogy at the University of Hawaii that same year. Ramelle has subsequently left science.

RESEARCH INTERESTS

My research interests focus on the genetics of host-pathogen coevolution. Our current studies focus on the genes of the major histocompatibility complex (MHC), which play a central role in vertebrate immune recognition. MHC genes are also the most polymorphic loci known for vertebrates and many MHC alleles confer susceptibility to autoimmune and infectious diseases. What evolutionary mechanisms account for the extreme diversity of MHC genes? Why are these demonstrably "bad" alleles not eliminated by natural selection? These questions currently form the central focus of my laboratory and lead to at least four major levels of inquiry involving host-parasite interactions, inbreeding, sexual selection and kin recognition systems. Our current understanding suggests the

following relationships. Parasite-driven selection favors MHC genetic diversity through both heterozygote advantage and relentless pathogen adaptation to common host genotypes, leading to rare MHC allele advantage. This in turn favors the evolution of MHC-based disassortative mating preferences because they preferentially produce high-fitness (disease-resistant) progeny. Such mating preferences would further increase MHC genetic diversity, making these loci increasingly useful as a kin recognition marker. Consequently, the avoidance of matings with kin (i.e. inbreeding) is an additional factor favoring MHC-based mating preferences. None of these hypothesized interactions enjoy definitive support and we are testing predictions from each. To test these hypotheses we use a varied set of approaches including laboratory experiments involving host-parasite interactions and sexual selection. We also use population and behavioral studies on natural and semi-natural populations of vertebrate species, primarily house mice. Molecular genetic techniques are utilized extensively to characterize the genotypes of both hosts and parasites in these studies. Below I briefly describe three major projects that are either underway or proposed.

MHC heterozygote superiority

If MHC heterozygotes were superior to both homozygotes in resisting infectious agents, this would contribute to MHC genetic diversity. However, this is seldom seen for single infectious agents. MHC heterozygotes would be superior over the course of multiple infections if resistance is generally dominant. We are testing this hypothesis with multiple pathogen combinations. The first test using *Salmonella* and Theiler's virus did reveal MHC heterozygote superiority (McClelland et al., 2003, *Infection and Immunity*).

Experimental pathogen evolution studies to characterize how pathogens adapt to hosts

As a pathogen is passaged through a series of genetically similar host individuals, virulence increases in the passage host, but decreases in previous hosts. This nearly universal result has profound implications for understanding host-pathogen interactions because it provides a powerful experimental method for identifying and characterizing the complex interactions between hosts and pathogens. We are using this approach to characterize pathogen escape of MHC-dependent immunity (McClelland et al., 2004, *Proc. Royal Society B*) and have recently published rapid.

Ecological functional genomics: using ecology to reveal gene function

A major problem in determining gene function is that many genes when disrupted reveal no phenotype. We have argued that many such genes function to solve ecological problems and as such, will fall into a category where expression of their phenotype will be ecology dependent. A particularly important aspect of *Mus* ecology that will help reveal phenotypes that have subtle health and vigor declines is male-male competition over territory ownership. Direct support for this hypothesis comes from our recent demonstration that the deleterious fitness effects of inbreeding in *Mus* are barely detectable using lab assays (10% effect), but are amplified 50-fold (in males) when analyzed under semi-natural population conditions (Meagher et. al. 2000). We are using this population ecology approach on a number of the developmentally important Hox genes that show no-phenotype when disrupted. We believe this will be a powerful general approach for determining the function of many genes.

Toxicity assessment using OPA assays

All too often, substances once considered safe at a particular dose are later found to have adverse consequences, usually through years or decades of epidemiological or experimental research. As a result, humanity often becomes the guinea pig of its mastery of applied chemistry. To prevent such experimentation on ourselves, there is a great need for broad, sensitive assays able to detect toxicity of many agents. We have discovered such an assay, which we call OPA (**O**rganismal **P**erformance **A**ssays). This assay uses house mice in seminatural populations (phenotrons) where experimental mice treated with the toxin compete directly with sham treated controls. This animal model achieves its breadth and sensitivity because **high performance from most physiological systems** is required for individual success, as determined by survival, social dominance, reproduction and a variety of other components of fitness. Consequently, any potentially toxic substance that reduces performance of any physiological system is likely to be detected in this assay. The first potential toxin tested using this assay, high fructose corn syrup, revealed substantial reductions in survival and competitive ability at doses considered safe and experienced by 20% of Americans. We are currently testing three pharmaceuticals (Vioxx, Paxil and Baycol) that failed in final clinical testing or after being released to the public. Two of the three show major fitness and health consequences during OPAs that were missed in preclinical and clinical screening. We envision OPAs as a major new tool to detect toxicities of a variety of treatments relevant to public health.