

## CURRICULUM VITAE

**Karl W. Broman**

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**EDUCATION**

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|-------------|---|
| 1997 – 1999 | Postdoctoral Fellow, Center for Medical Genetics, Marshfield Medical Research Foundation, Marshfield, Wisconsin (Advisor: James L. Weber)               |
| 1997        | PhD, Statistics, University of California, Berkeley (Advisor: Terry Speed; thesis: <i>Identifying quantitative trait loci in experimental crosses</i> ) |
| 1991        | BS, <i>Summa Cum Laude</i> , Mathematics, University of Wisconsin–Milwaukee   |

**PROFESSIONAL POSITIONS**

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|----------------|---|
| 2009 – present | Professor, Department of Biostatistics and Medical Informatics, School of Medicine and Public Health, University of Wisconsin–Madison           |
| 2007 – 2009    | Associate Professor, Department of Biostatistics and Medical Informatics, School of Medicine and Public Health, University of Wisconsin–Madison |
| 2002 – 2007    | Associate Professor, Department of Biostatistics, Bloomberg School of Public Health, The Johns Hopkins University, Baltimore, Maryland          |
| 1999 – 2002    | Assistant Professor, Department of Biostatistics, Bloomberg School of Public Health, The Johns Hopkins University, Baltimore, Maryland          |
| 1999           | Associate Research Scientist, Center for Medical Genetics, Marshfield Medical Research Foundation, Marshfield, Wisconsin                        |

**ADDITIONAL PROFESSIONAL APPOINTMENTS**

Affiliate faculty member, Department of Statistics, University of Wisconsin–Madison  
 Faculty trainer, Biostatistics Training Program, Cellular and Molecular Pathology Graduate Program, Computation and Informatics in Biology and Medicine Training Program, Genetics PhD Program, Genomic Sciences Training Program, Master of Public Health Program, Plant Breeding and Plant Genetics Program, and Population Health Graduate Program, University of Wisconsin–Madison

## RESEARCH INTERESTS

My research concerns statistical issues arising in problems in genetics and genomics. I focus particularly on the characterization of meiotic recombination and the development of improved methods for detecting and identifying genes contributing to variation in complex phenotypes in experimental organisms.

## SCIENTIFIC ADVISORY BOARDS

2009 – 2016      Nature Source Genetics, Ithaca, New York

2010 – 2011      Wisconsin Genomics Initiative

## HONORS AND AWARDS

Fellow of the American Statistical Association (2016)  
 Graduate of the Last Decade Award, University of Wisconsin–Milwaukee Alumni Association (2001)  
 Best Paper in *Genetic Epidemiology* in 1999, International Genetic Epidemiology Society (2000)  
 John Wasmuth Fellowship in Genomic Analysis, National Human Genome Research Institute (1998)  
 Evelyn Fix Prize for great promise in statistical research, University of California, Berkeley (1997)  
 Outstanding Graduate Student Instructor, University of California, Berkeley (1997)  
 University Fellowship, University of California, Berkeley (1994)  
 Phi Beta Kappa Society (1991)  
 General Chemistry Award, University of Wisconsin–Milwaukee (1989)  
 Wisconsin All-State Scholar (1988)

## PROFESSIONAL SOCIETY MEMBERSHIPS

American Association of University Professors  
 American Statistical Association  
 Genetics Society of America  
 Institute of Mathematical Statistics  
 International Biometric Society (ENAR)

## EDITORIAL ACTIVITIES

### Editorial Board Membership

2016 – present    Senior Editor, *Genetics*  
 2016 – present    Editorial Board, *BMC Biology*  
 2017 – 2019      Academic Editor, *PeerJ*  
 2004 – 2010      Associate Editor, *Genetics*  
 2006 – 2009      Associate Editor, *Journal of the American Statistical Association*, Applications and Case Studies  
 2004 – 2007      Associate Editor, *Biostatistics*

### Peer Review Activities

*Referee* for American Journal of Epidemiology; American Journal of Human Genetics; American

Statistician; Annals of Applied Statistics; Annals of Human Genetics; Annals of Statistics; Arteriosclerosis, Thrombosis, and Vascular Biology; Bioinformatics; Biometrics; Biostatistics; BMC Bioinformatics; BMC Biology; BMC Genetics; BMC Genomics; BMC Medical Research Methodology; BMC Proceedings; BMC Research Notes; Cancer Research; Circulation Research; Computational Statistics & Data Analysis; Crop Science; eLife; European Journal of Human Genetics; Evolution; Gene; Genes, Brain, and Behavior; Genes & Immunity; Genetic Epidemiology; Genetica; Genetical Research; Genetics; Genetics Research; Genetics Selection Evolution; Genome; Genome Research; Genomics; Growth, Development, & Aging; Harvard Data Science Review; Heredity; Human Genetics; Human Heredity; Human Molecular Genetics; IEEE/ACM Transactions on Computational Biology and Bioinformatics; Journal of Agricultural, Biological, and Environmental Statistics; Journal of the American Society of Nephrology; Journal of the American Statistical Association; Journal of Applied Genetics; Journal of Bioinformatics and Computational Biology; Journal of Computational and Graphical Statistics; Journal of Fish Biology; Journal of Heredity; Journal of Immunology; Journal of Neuroscience; Journal of Open Source Software; Journal of Statistical Distributions and Applications; Journal of Statistical Planning and Inference; Journal of Statistical Software; Mammalian Genome; Methods in Ecology and Evolution; Molecular Biology and Evolution; Molecular Ecology Resources; Molecular Genetics and Genomics; Molecular Informatics; Nature Communications; Nature Genetics; Nature Methods; Nature Protocols; Nature Reviews–Genetics; Nucleic Acids Research; Ophthalmic Epidemiology; Pacific Symposium on Biocomputing; Physical Review Letters; Physiological Genomics; Plant Cell; PLoS Biology; PLoS Computational Biology; PLoS Genetics; PLoS ONE; Proceedings of the National Academy of Sciences USA; R Journal; Scandinavian Journal of Immunology; Science; Statistical Applications in Genetics and Molecular Biology; Statistics; Theoretical Population Biology; and Trends in Genetics

*Book reviewer* for Arnold Publishers, Chapman & Hall/CRC, Columbia University Press, Oxford University Press, Princeton University Press, Springer–Verlag, and Taylor & Francis

## Review Panels

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|-------------|--|
| 2010 – 2015 | Center for Inherited Disease Research (CIDR) Access Committee, National Human Genome Research Institute, National Institutes of Health ( <i>Chair</i> , 2014 – 2015) |
| 2006 – 2010 | Genomics, Computational Biology, and Technology Study Section (GCAT), Center for Scientific Review, National Institutes of Health                                    |

## Ad hoc Review of Proposals

Center for Inherited Disease Research Access Committee; Clinical Research Review Committee, National Center for Research Resources; Genomics, Computational Biology, and Technology Study Section (NIH); Hatch grant competition, College of Agriculture and Life Sciences, University of Wisconsin–Madison; Johns Hopkins Center for Alternatives to Animal Testing; Mammalian Genetics Study Section (NIH); Microsoft Research European Fellowship Programme; National Cancer Institute Special Emphasis Panel (NIH); National Institute of Environmental Health Sciences Special Emphasis Panel (NIH); National Institute on Aging Special Emphasis Panel (NIH); National Science Council (Republic of China); National Science Foundation; National Sciences and Engineering Research Council (Canada); Council for Earth and Life Sciences, Netherlands Organization for Scientific Research; Neurological Sciences and Disorders A Study Section (NIH); and Telethon (Italy)

## PUBLICATIONS

### Books

**Broman KW, Sen Ś** (2009) *A Guide to QTL Mapping with R/qtl*. Springer (ISBN: 978-0-387-92124-2)

## Journal Articles

**Broman KW** (2020) Reproducibility report: Identifying essential genes by mutagenesis. *ReScience C*, to appear

Schwerbel K, Kamitz A, Krahmer N, Hallahan N, Jähnert M, Gottmann P, Lebek S, Schallschmidt T, Arends D, Schumacher F, Kleuser B, Haltenhof T, Heyd F, Gancheva S, **Broman KW**, Roden M, Joost HG, Chadt A, Al-Hasani H, Vogel H, Jonas W, Schürmann A (2020) Immunity-related GTPase induces lipophagy to prevent excess hepatic lipid accumulation. *J Hepatol*, to appear

2020 Rodriguez-Gil JL, Watkins-Chow DE, Baxter LL, Elliot G, Harper UL, Wincovitch SM, Wedel JC, Incao AA, Huebeker M, Boehm FJ, Garver WS, Porter FD, **Broman KW**, Platt FM, Pavan BJ (2020) Genetic background modifies phenotypic severity and longevity in a mouse model of Niemann-Pick Disease Type C1. *Dis Model Mech* 13:dmm042614

2019 Keller MP, Rabaglia ME, Schueler KL, Stapleton DS, Gatti DM, Vincent M, Mitok KA, Wang Z, Ishimura T, Simonett SP, Emfinger CH, Das R, Beck T, Kendzierski C, **Broman KW**, Yandell BS, Churchill GA, Attie AD (2019) Gene loci associated with insulin secretion in islets from non-diabetic mice. *J Clin Invest* 130:4419–4432

Kemis JH, Linke V, Barrett KL, Boehm FJ, Traeger LL, Keller MP, Rabaglia ME, Schueler KL, Stapleton DS, Gatti DM, Churchill GA, Amador-Noguez D, Russell JD, Yandell BS, **Broman KW**, Coon JJ, Attie AD, Rey FE (2019) Genetic determinants of gut microbiota composition and bile acid profiles in mice. *PLoS Genet* 15: e1008073

Boehm FJ, Chesler EJ, Yandell BS, **Broman KW** (2019) Testing pleiotropy vs. separate QTL in multiparental populations. *G3* 9:2317–2324

Boehm F, Yandell B, **Broman KW** (2019) qtl2pleio: Testing pleiotropy vs. separate QTL in multiparental populations. *J Open Source Software* 4(38):1435

**Broman KW**, Gatti DM, Svenson KL, Sen S, Churchill GA (2019) Cleaning genotype data from Diversity Outbred mice. *G3* 9:1571–1579

**Broman KW**, Gatti DM, Simecek P, Furlotte NA, Prins P, Sen S, Yandell BS, Churchill GA (2019) R/qtl2: software for mapping quantitative trait loci with high-dimensional data and multi-parent populations. *Genetics* 211:495–502

2018 Palus M, Sohrabi Y, **Broman KW**, Strnad H, Šíma M, Růžek D, Volkova V, Slapničková M, Vojtíšková J, Mrázková L, Salát J, Lipoldová M (2018) A novel locus on mouse chromosome 7 that influences survival after infection with tick-borne encephalitis virus. *BMC Neurosci* 19:39

Keller MP, Gatti DM, Schueler KL, Rabaglia ME, Stapleton DS, Simecek P, Vincent M, Allen S, Broman AT, Bacher R, Kendzierski C, **Broman KW**, Yandell BS, Churchill GA, Attie AD (2018) Genetic drivers of pancreatic islet function. *Genetics* 209:335–356

**Broman KW**, Woo KH (2018) Data organization in spreadsheets. *Am Stat* 72:2–10

Keele GR, Prokop JW, He H, Holl K, Littrell J, Deal A, Francic S, Cui L, Gatti DM, **Broman KW**, Tschannen M, Tsaih S-W, Zagloul M, Kim Y, Baur B, Fox J, Robinson M, Levy S, Flister MJ, Mott R, Valdar W, Solberg Woods LC (2018) Genetic fine-mapping and identification of candidate genes and variants for adiposity traits in outbred rats. *Obesity* 26:213–222

- 2017 Florek NW, Kamlangdee A, Mutschler JP, Kingstad-Bakke B, Schultz-Darken N, **Broman KW**, Osorio JE, Friedrich TC (2017) A modified vaccinia Ankara vaccine vector expressing a mosaic H5 hemagglutinin reduces viral shedding in rhesus macaques. *PLoS ONE* 12:e0181738
- Wang RJ, Gray MM, Parmenter MD, **Broman KW**, Payseur BA (2017) Recombination rate variation in mice from an isolated island. *Mol Ecol* 26:457–470
- 2016 Keller MP, Paul PK, Rabaglia ME, Stapleton DS, Schueler KL, Broman AT, Ye SI, Leng N, Brandon CJ, Neto EC, Plaisier CL, Simonett SP, Kebede MA, Sheynkman GM, Klein MA, Baliga NS, Smith LM, **Broman KW**, Yandell BS, Kendziorski C, Attie AD (2016) The transcription factor *Nfatc2* regulates  $\beta$ -cell proliferation and genes associated with type 2 diabetes in mouse and human islets. *PLoS Genet* 12:e1006466
- Parmenter MD, Gray MM, Hogan CA, Ford IN, **Broman KW**, Vinyard CJ, Payseur BA (2016) Genetics of skeletal evolution in unusually large mice from Gough Island. *Genetics* 204:1559–1572
- Zigler JS Jr, Hodgkinson CA, Wright M, Klise A, Sundin O, **Broman KW**, Hejtmancik F, Huang H, Patek B, Sergeev Y, Hose S, Brayton C, Xiaodong J, Vasquez D, Maragakis N, Mori S, Goldman D, Hoke A, Sinha D (2016) A spontaneous missense mutation in branched chain keto acid dehydrogenase kinase in the rat affects both the central and peripheral nervous systems. *PLoS ONE* 11:e0160447
- Sloan Z, Arends D, **Broman KW**, Centeno A, Furlotte N, Nijveen H, Yan L, Zhou X, Williams RW, Prins P (2016) GeneNetwork: framework for web-based genetics. *J Open Source Software* 1(2):25
- De Simone M, Spagnuolo L, Lorè NI, Cigana C, De Fino I, **Broman KW**, Iraqi FA, Bragonzi A (2016) Mapping genetic determinants of host susceptibility to *Pseudomonas aeruginosa* lung infection in mice. *BMC Genomics* 17:351
- Tian J, Keller MP, Broman AT, Kendziorski C, Yandell BS, Attie AD, **Broman KW** (2016) The dissection of expression quantitative trait locus hotspots. *Genetics* 202:1563–1574
- Gruhn JR, Al-Asmar N, Fasnacht R, Maylor-Hagen H, Peinado V, Rubio C, **Broman KW**, Hunt PA, Hassold T (2016) Correlations between synaptic initiation and meiotic recombination: A study of humans and mice. *Am J Hum Genet* 98:102–115
- Kwak I-L, Moore CR, Spalding EP, **Broman KW** (2016) Mapping quantitative trait loci underlying function-valued traits using functional principal component analysis and multi-trait mapping. *G3* 6:79–86
- 2015 Tian J, Keller MP, Oler AT, Rabaglia ME, Schueler KL, Stapleton DS, Broman AT, Zhao W, Kendziorski C, Yandell BS, Hagenbuch B, **Broman KW**, Attie AD (2015) Identification of the bile acid transporter *Slco1a6* as a candidate gene that broadly affects gene expression in mouse pancreatic islets. *Genetics* 201:1253–1262
- Broman KW**, Keller MP, Broman AT, Kendziorski C, Yandell BS, Sen Ś, Attie AD (2015) Identification and correction of sample mix-ups in expression genetic data: A case study. *G3* 5:2177–2186
- Gray MM, Parmenter M, Hogan C, Ford I, Cuthbert RJ, Ryan PG, **Broman KW**, Payseur BA (2015) Genetics of rapid and extreme size evolution in island mice. *Genetics* 201:213–228
- Whitney KD, **Broman KW**, Kane NC, Hovick SM, Randell RA, Rieseberg LH (2015) Quantitative trait locus mapping identifies candidate alleles involved in adaptive introgression and range expansion in a wild sunflower. *Mol Ecol* 24:2194–2211
- Broman KW** (2015) R/qtcharts: Interactive graphics for quantitative trait locus mapping. *Genetics* 199:359–361

- 2014 Florek NW, Weinfurter JT, Jegaskanda S, Brewoo JN, Powell TD, Young GR, Das SC, Hatta M, **Broman KW**, Hungnes O, Dudman SG, Kawaoka Y, Kent SJ, Stinchcomb DT, Osorio JE, Friedrich TC (2014) Modified vaccinia Ankara encoding influenza virus hemagglutinin induces heterosubtypic immunity in macaques. *J Virol* 88:13418–13428
- Gatti DM, Svenson KL, Shabalin A, Wu L-Y, Valdar W, Simecek P, Goodwin N, Cheng R, Pomp D, Palmer A, Chesler EJ, **Broman KW**, Churchill GA (2014) Quantitative trait locus mapping methods for Diversity Outbred mice. *G3* 4:1623–1633
- Street VA, Kujawa SG, Manichaikul A, **Broman KW**, Kallman JC, Shilling DJ, Iwata AJ, Robinson LC, Robbins CA, Li J, Liberman MC, Tempel BL (2014) Resistance to noise-induced hearing loss in 129S6 and MOLF mice: Identification of independent, overlapping, and interacting chromosomal regions. *J Assoc Res Otolaryngol* 15:721–738
- Kwak I-Y, Moore CR, Spalding EP, **Broman KW** (2014) A simple regression-based method to map quantitative trait loci underlying function-valued phenotypes. *Genetics* 197: 1409–1416
- Broman KW** (2014) Fourteen years of R/qtl: Just barely sustainable. *J Open Res Softw* 2(1):e11
- Rowsey R, Gruhn J, **Broman KW**, Hunt PA, Hassold T (2014) Examining variation in recombination levels in the human female: A test of the production line hypothesis. *Am J Hum Genet* 95:108–112
- Huang BE, Raghavan C, Mauleon R, **Broman KW**, Leung H (2014) Efficient imputation of missing markers in low-coverage genotyping-by-sequencing data from multi-parent crosses. *Genetics* 197:401–404
- Baier B, Hunt P, **Broman KW**, Hassold T (2014) Variation in genome-wide levels of meiotic recombination is established at the onset of prophase in mammalian males. *PLoS Genet* 10:e1004125
- 2013 Gruhn JR, Rubio C, **Broman KW**, Hunt PA, Hassold T (2013) Cytological studies of human meiosis: sex-specific differences in recombination originate at, or prior to, establishment of double-strand breaks. *PLoS ONE* 8:e85075
- Moore CR, Johnson LS, Kwak IY, Livny M, **Broman KW**, Spalding EP (2013) High-throughput computer vision introduces the time axis to a quantitative trait map of a plant growth response. *Genetics* 195:1077–1086
- Bautz DJ, **Broman KW**, Threadgill DW (2013) Identification of a novel polymorphism in X-linked sterol-4-alpha-carboxylate 3-dehydrogenase (Nsdhl) associated with reduced HDL cholesterol levels in I/LnJ mice. *G3* 3:1819–1825
- Harris M, Burns CM, Becker EA, Braasch AT, Gostick E, Johnson RC, **Broman KW**, Price DA, Friedrich TC, O'Connor SL (2013) Acute-phase CD8 T cell responses that select for escape variants are needed to control live attenuated simian immunodeficiency virus. *J Virol* 87:9353–9364
- Maenner MJ, Baker MW, **Broman KW**, Tian J, Barnes JK, Atkins A, McPherson E, Hong J, Brilliant MH, Mailick MR (2013) *FMR1* CGG expansions: Prevalence and sex ratios. *Am J Med Genet B Neuropsychiatr Genet* 162:466–473
- 2012 **Broman KW**, Kim S, Sen S, Ané C, Payseur BA (2012) Mapping quantitative trait loci onto a phylogenetic tree. *Genetics* 192:167–179

Rice CA, Riehl J, **Broman K**, Soukup JW, Gengler WR (2012) Comparing the degree of exothermic polymerization in commonly used acrylic and provisional composite resins for intraoral appliances. *J Vet Dent* 29: 78–83

Galvan A, Colombo F, Noci S, Pazzaglia S, Mancuso M, Manenti G, **Broman KW**, Saran A, Dragani TA (2012) The *Lsktm1* locus modulates lung and skin tumorigenesis in the mouse. *G3* 2:1041–1046

Greene JM, Chin EN, Budde ML, Lhost JJ, Hines PJ, Burwitz BJ, **Broman KW**, Nelson JE, Friedrich TC, O'Connor DH (2012) *Ex vivo* SIV-specific CD8 T cell responses in heterozygous animals are primarily directed against peptides presented by a single MHC haplotype. *PLoS ONE* 7:e43690

Neto EC, Keller MP, Broman AF, Attie AD, Jansen RC, **Broman KW**, Yandell BS (2012) Quantile-based permutation thresholds for quantitative trait loci hotspots. *Genetics* 191:1355–1365

King EG, Merkes CM, McNeil CL, Hoofer SR, Sen S, **Broman KW**, Long AD, Macdonald SJ (2012) Genetic dissection of a model complex trait using the *Drosophila* Synthetic Population Resource. *Genome Res* 22:1558–1566

Wang CY, Stapleton DS, Schueler KL, Rabaglia ME, Oler AT, Keller MP, Kendzierski CM, **Broman KW**, Yandell BS, Schadt EE, Attie ED (2012) *Tsc2*, a positional candidate gene underlying a quantitative trait locus for hepatic steatosis. *J Lipid Res* 53:1493–1501

Arends D, van der Velde KJ, Prins P, **Broman KW**, Möller S, Jansen RC, Swertz MA (2012) xQTL workbench: a web based environment for xQTL analysis. *Bioinformatics* 28:1042–1044

Amlin-Van Schaick JC, Kim S, **Broman KW**, Reilly KM (2012) *Scram1* is a modifier of spinal cord resistance for astrocytoma on mouse chromosome 5. *Mamm Genome* 23:277–285

**Broman KW** (2012) Genotype probabilities at intermediate generations in the construction of recombinant inbred lines. *Genetics* 190:403–412

**Broman KW** (2012) Haplotype probabilities in advanced intercross populations. *G3* 2:199–202

Collaborative Cross Consortium [97 authors] (2012) The genome architecture of the Collaborative Cross mouse genetic reference population. *Genetics* 190:389–401

Amlin-Van Schaick JC, Kim S, DiFabio C, Lee M-H, **Broman KW**, Reilly KM (2012) *Arlm1* is a male-specific modifier of astrocytoma resistance on mouse chr 12. *Neuro Oncol* 14:160–174

Davis RC, Van Nas A, Castellani LW, Zhao Y, Zhou Z, Wen P, Yu S, Qi H, Rosales M, Schadt EE, **Broman KW**, Peterfy M, Lusi AJ (2012) Systems genetics of susceptibility to obesity-induced diabetes in mice. *Physiol Genomics* 44:1–13

2011 Weinfurter JT, Brunner K, Capuano SV III, Li C, **Broman KW**, Kawaoka Y, Friedrich T (2011) Cross-reactive T cells are involved in rapid clearance of 2009 pandemic H1N1 influenza virus in nonhuman primates. *PLoS Pathog* 7:e1002381

Aylor DL, Valdar W, Foulds-Mathes W, Buus RJ, Verdugo RA, Baric RS, Ferris MT, Frelinger JA, Heise M, Frieman MB, Gralinski LE, Bell TA, Didion JD, Hua K, Nehrenberg DL, Powell CL, Steigerwalt J, Xie Y, Kelada SNP, Collins F, Yang IV, Schwartz DA, Branstetter LA, Chesler EJ, Miller DR, Spence J, Liu EY, McMillan L, Sarkar A, Wang J, Wang W, Zhang Q, **Broman KW**, Korstanje R, Durrant C, Mott R, Iraqi FA, Pomp D, Threadgill D, Pardo-Manuel de Villena F, Churchill GA (2011) Genetic analysis of complex traits in the emerging Collaborative Cross. *Genome Res* 21:1213–1222

Greene JM, Wiseman RW, Lank SM, Bimber BN, Karl JA, Burwitz BJ, Lhost JJ, Hawkins OE, Kunstman KJ, **Broman KW**, Wolinsky SM, Hildebrand WH, O'Connor DH (2011) Differential MHC class I expression in distinct leukocyte subsets. *BMC Immunol* 12:39

Bradley KM, Breyer JP, Melville DB, **Broman KW**, Knapik EW, Smith JR (2011) A SNP-based linkage map for zebrafish reveals sex determination loci. *G3* 1:3–9

Moreland AJ, Guethlein LA, Reeves RK, **Broman KW**, Johnson RP, Parham P, O'Connor DH, Bimber BN (2011) Characterization of killer immunoglobulin-like receptor genetics and comprehensive genotyping by pyrosequencing in rhesus macaques. *BMC Genomics* 12:295

Svetec N, Werzner A, Wilches R, Pavlidis P, Álvarez-Castro JM, **Broman KW**, Metzler D, Stephan W (2011) Identification of X-linked quantitative trait loci affecting cold tolerance in *Drosophila melanogaster* and fine-mapping by selective sweep analysis. *Mol Ecol* 20:530–544

2010 Murdoch B, Owen N, Shirley S, Crumb S, **Broman KW**, Hassold T (2010) Multiple loci contribute to genome-wide recombination levels in male mice. *Mamm Genome* 21:550–555

Billings T, Sargent EE, Szatkiewicz JP, Leahy N, Kwak, I-Y, Bektassova N, Walker M, Hassold T, Graber JH, **Broman KW**, Petkov PM (2010) Patterns of recombination activity on mouse chromosome 11 revealed by high resolution mapping. *PLoS ONE* 5:e15340

Arends D, Prins P, Jansen RC, **Broman KW** (2010) R/qtl: High-throughput multiple QTL mapping. *Bioinformatics* 26:2990–2992

Bader HL, Ruhe AL, Wang LW, Wong AK, Walsh KF, Packer RA, Mitelman J, Robertson KR, O'Brien DP, **Broman KW**, Shelton GD, Apte SS, Neff MW (2010) An *ADAMTSL2* founder mutation causes Musladin-Lueke Syndrome, a heritable disorder of beagle dogs, featuring stiff skin and joint contractures. *PLoS ONE* 5:e12817

Jurisc G, Sundberg JP, Bleich A, Leiter EH, **Broman KW**, Buechler G, Alley L, Vestweber D, Detmar M. (2010) Quantitative lymphatic vessel trait analysis suggests *Vcam1* as candidate modifier gene of inflammatory bowel disease. *Genes Immun* 11:219–231

Burrage LC, Baskin-Hill AE, Sinasac DS, Singer JB, Croniger CM, Kirby A, Kulbokas EJ, Daly MJ, Lander ES, **Broman KW**, Nadeau JH (2010) Genetic resistance to diet-induced obesity in chromosome substitution strains of mice. *Mamm Genome* 21:115–129

Greene JM, Lhost JJ, Burwitz BJ, Budde ML, Macnair CE, Weiker MK, Gostick E, Friedrich TC, **Broman KW**, Price DA, O'Connor SL, O'Connor DH (2010) Extralymphoid CD8<sup>+</sup> T cells resident in tissue from Simian Immunodeficiency Virus SIVmac239Δnef-vaccinated macaques suppress SIVmac239 replication *ex vivo*. *J Virol* 84:3362–3372

Wong AK, Ruhe AL, Dumont BL, Robertson KR, Guerrero G, Shull SM, Ziegler JS, Millon LV, **Broman KW**, Payseur BA, Neff MW (2010) A comprehensive linkage map of the dog genome. *Genetics* 184:595–605

2009 Shavit JA, Manichaikul A, Lemmerhirt HL, **Broman KW**, Ginsburg D (2009) Modifiers of von Willebrand factor identified by natural variation in inbred strains of mice. *Blood* 114:5368–5374

Cheng EY, Hunt PA, Nalwai-Cecchini TA, Fligner CL, Fujimoto VY, Pasternack TL, Schwartz JM, Woodruff TJ, Cherry SM, Hansen TA, Vallente RU, **Broman KW**, Hassold TJ (2009) Meiotic recombination in human oocytes. *PLoS Genet* 5:e1000661



Fledel-Alon A, Wilson DJ, **Broman KW**, Wen W, Ober C, Coop G, Przeworski M (2009) Broad-scale recombination patterns underlying proper disjunctions in humans. *PLoS Genet* 5:e1000658

Cox A, Ackert-Bicknell CL, Dumont BL, Ding Y, Bell, JT, Brockmann GA, Wergedal JE, Bult C, Paigen B, Flint J, Tsaih S-W, Churchill GA, **Broman KW** (2009) A new standard genetic map for the laboratory mouse. *Genetics* 182:1335–1344

Dumont BL, **Broman KW**, Payseur BA (2009) Variation in genomic recombination rates among heterogeneous stock mice. *Genetics* 182:1345–1349

Manichaikul A, **Broman KW** (2009) Binary trait mapping in experimental crosses with selective genotyping. *Genetics* 182:863–874

Venkatesan M, **Broman KW**, Sellers M, Rasgon JL (2009) An initial linkage map of the West Nile Virus vector *Culex tarsalis*. *Insect Mol Biol* 18:453–463

Sen S, Johannes F, **Broman KW** (2009) Selective genotyping and phenotyping strategies in a complex trait context. *Genetics* 181:1613–1626

Manichaikul A, Moon JY, Sen S, Yandell BS, **Broman KW** (2009) A model selection approach for the identification of quantitative trait loci in experimental crosses, allowing epistasis. *Genetics* 181:1077–1086 [Erratum: *Genetics* 184:607, 2010]

2008 Shao H, Burrage LC, Sinasac DS, Hill AE, Ernest SR, O'Brien W, Courtland HW, Jepsen KJ, Kirby A, Kulbokas EJ, Daly MJ, **Broman KW**, Lander ES, Nadeau JH (2008) Genetic architecture of complex traits: Large phenotypic effects and pervasive epistasis. *Proc Natl Acad Sci USA* 105:19910–19914

Hill M, **Broman KW**, Stupka E, Smith W, Jiang D, Sidow A (2008) The *C. savignyi* genetic map and its integration with the reference sequence facilitates insights into chordate genome evolution. *Genome Res* 18:1369–1379

Lupi I, **Broman KW**, Tzuo S-C, Gutenberg A, Martino E, Caturegli P (2008) Novel autoantigens in autoimmune hypophysitis. *Clin Endocrinol* 69:269–278

Paigen K, Szatkiewicz JP, Sawyer K, Leahy N, Parvanov ED, Ng SH, Graber JH, **Broman KW**, Petkov PM (2008) The recombinational anatomy of a mouse chromosome. *PLoS Genet* 4(7): e1000119

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#### Proceedings and Book Chapters

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## Technical Reports and Preprints

Lobo AK, Traeger LL, Keller MP, Attie AD, Rey FE, **Broman KW** (2019) Identification of sample mix-ups and mixtures in microbiome data in Diversity Outbred mice. *bioRxiv* doi:10.1101/529040

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Bowman KO, Shenton LR, Kastenbaum MA, **Broman K** (1992) Overdispersion: Notes on discrete distributions. Technical Report ORNL/TM-12167, Oak Ridge National Laboratory

## SOFTWARE AND OTHER RESOURCES

|                      |   |
|----------------------|---|
| R/qtl                | An R package for mapping genes contributing to variation in quantitative traits in experimental crosses ( <a href="http://rqtl.org">rqtl.org</a> ).   |
| R/qtl2               | A reimplement of the R package R/qtl, to better handle high-dimensional data and complex cross designs. ( <a href="http://kbroman.org/qtl2">kbroman.org/qtl2</a> ).   |
| R/qtlcharts          | An R package to create interactive data visualizations for quantitative trait locus mapping data ( <a href="http://kbroman.org/qtlcharts">kbroman.org/qtlcharts</a> ).  |
| aRxiv                | An R package for searching arXiv, a repository of electronic preprints for computer science, mathematics, physics, quantitative biology, quantitative finance, and statistics. ( <a href="https://github.com/ropensci/aRxiv">github.com/ropensci/aRxiv</a> ). |
| git/GitHub guide     | Online tutorial on the git version control system and its use with GitHub.com ( <a href="http://kbroman.org/github_tutorial">kbroman.org/github_tutorial</a> ).   |
| knitr in a knutshell | Online tutorial on knitr, a tool for creating documents that mix code and text ( <a href="http://kbroman.org/knitr_knutshell">kbroman.org/knitr_knutshell</a> ).  |
| minimal make         | Online tutorial on GNU Make, for automating computational tasks ( <a href="http://kbroman.org/minimal_make">kbroman.org/minimal_make</a> ).   |

|                         |   |
|-------------------------|---|
| R package primer        | Online tutorial on writing packages for the R statistical software ( <a href="http://kbroman.org/pkg_primer">kbroman.org/pkg_primer</a> ).  |
| simple site             | Online tutorial on constructing simple websites with GitHub Pages ( <a href="http://kbroman.org/simple_site">kbroman.org/simple_site</a> ). |
| RelCheck                | Software for the verification of relationships between individuals with use of autosomal genotype data.                                     |
| Marshfield genetic maps | Genetic maps of the human genome, with internet-based tools for the search for genetic markers and semi-automated map construction.         |

## EDUCATIONAL ACTIVITIES

### PhD Advisees

Quoc Tran, PhD student, Statistics, University of Wisconsin–Madison

Fred Boehm, PhD student, Statistics, University of Wisconsin–Madison (Thesis: *Testing pleiotropy vs. separate QTL in multiparental populations*), 2019

Jianan Tian, PhD, Statistics, University of Wisconsin–Madison (Thesis: *Dissection and fine-mapping of trans-eQTL hotspots*), 2015

Il-Youp Kwak, PhD, Statistics, University of Wisconsin–Madison (Thesis: *Regression-based methods to map quantitative trait loci underlying function-valued phenotypes*), 2014

Ani Manichaikul, PhD, Biostatistics, Johns Hopkins Bloomberg School of Public Health (Thesis: *Statistical methods for mapping quantitative trait loci in experimental crosses*), 2007

Wei-Min Chen, PhD, Biostatistics, Johns Hopkins Bloomberg School of Public Health (Thesis: *Robust quantitative trait linkage analysis in extended human pedigrees*), 2004

### Master's Advisees

Sungjin Kim, MS, Statistics, University of Wisconsin–Madison, 2011

Laura C. Plantinga, ScM, Biostatistics, Johns Hopkins Bloomberg School of Public Health (Thesis: *Inference of clusters of related individuals with dominant genetic marker data*), 2001

### Undergraduate Advisees

Alexandra Lobo, summer student, Biomedical Data Science Summer Research Program, University of Wisconsin–Madison, summer, 2017

Janel Barnes, summer student, Integrated Biological Sciences Summer Research Program, University of Wisconsin–Madison, summer, 2012

Leah Fehr, summer student, Integrated Biological Sciences Summer Research Program, University of Wisconsin–Madison, summer, 2008

### Academic Advisees, University of Wisconsin–Madison

2018 – present    Alexandra Spicer

MS candidate, Biomedical Data Science



## Academic Advisees, Johns Hopkins University

|             |                         |                                     |
|-------------|-------------------------|-------------------------------------|
| 2006 – 2007 | Sheng-Chih Jin          | ScM candidate, Biostatistics        |
| 2005 – 2007 | Ani Manichaikul         | PhD candidate, Biostatistics        |
| 2005 – 2006 | Alex Phan               | candidate for MHS in Bioinformatics |
| 2005 – 2006 | Jichao Chen             | candidate for MHS in Bioinformatics |
| 2004 – 2006 | Snaebjorn Gunnsteinsson | PhD candidate, Biostatistics        |
| 2003 – 2007 | Benilton Carvalho       | PhD candidate, Biostatistics        |
| 2003 – 2005 | Wenyi Wang              | PhD candidate, Biostatistics        |
| 2000 – 2004 | Wei-Min Chen            | PhD candidate, Biostatistics        |
| 2000 – 2003 | Michelle Shardell       | PhD candidate, Biostatistics        |
| 1999 – 2001 | Sora Kim                | ScM candidate, Biostatistics        |

## Doctoral Thesis Committees, University of Wisconsin–Madison

|                |                              |                                   |
|----------------|------------------------------|-----------------------------------|
| 2019 – present | Athena Golfinos              | Cellular and Molecular Pathology  |
| 2018 – present | Michael Kartje               | Genetics                          |
| 2017 – present | Jeremy Lange                 | Genetics                          |
| 2017 – present | Christopher McAllester       | Genetics                          |
| 2016 – present | April Peterson               | Genetics                          |
| 2015 – present | Quentin Sprengelmeyer        | Genetics                          |
| 2018 – 2020    | Theeva Chandereng            | Statistics                        |
| 2012 – 2019    | Molly McDevitt               | Biochemistry                      |
| 2017 – 2018    | Kyubin Lee                   | Computer Sciences                 |
| 2015 – 2018    | René Welch                   | Statistics                        |
| 2012 – 2017    | Michelle Parmenter           | Genetics                          |
| 2014 – 2017    | Alessandra York              | Genetics                          |
| 2013 – 2017    | Richard Wang                 | Genetics                          |
| 2013 – 2016    | Shuang Huang                 | Statistics                        |
| 2011 – 2013    | Raja Farhana Raja Mohd Anuar | Plant Breeding and Plant Genetics |
| 2010 – 2015    | Katie Clowers                | Genetics                          |
| 2010           | Jingfang Zhang               | Oncology                          |
| 2010 – 2011    | Michael White                | Genetics                          |
| 2010           | Elias Chaibub Neto           | Statistics                        |
| 2007 – 2010    | Beth Dumont                  | Genetics                          |

## Doctoral Thesis Committees, Johns Hopkins University

|             |                      |                                       |
|-------------|----------------------|---------------------------------------|
| 2006 – 2007 | Meera Venkatesan     | Molecular Microbiology and Immunology |
| 2006 – 2007 | Ching-Yu Cheng       | Epidemiology                          |
| 2005 – 2007 | Robert Wojciechowski | Epidemiology                          |
| 2004 – 2007 | Tanya Teslovich      | Human Genetics (School of Medicine)   |
| 2004 – 2005 | Katherine Swanson    | Molecular Microbiology and Immunology |
| 2003 – 2004 | Shin Lin             | Human Genetics (School of Medicine)   |
| 2003 – 2004 | Adele Mitchell       | Human Genetics (School of Medicine)   |
| 2002 – 2003 | Rivka Glaser         | Human Genetics (School of Medicine)   |
| 2002        | Shawn Soutiere       | Environmental Health Sciences         |
| 2001 – 2004 | Sadeep Shresthra     | Epidemiology                          |
| 2001 – 2002 | Rasika Mathias       | Epidemiology                          |
| 1999 – 2002 | Cynthia James        | Human Genetics (School of Medicine)   |

## Oral Exams, University of Wisconsin–Madison

|      |                |          |
|------|----------------|----------|
| 2019 | Michael Kartje | Genetics |
|------|----------------|----------|

|      |   |   |
|------|---|---|
| 2018 | Christopher McAllester<br>Thevaa Chandereng   | Genetics<br>Statistics  |
| 2017 | Constanza Rojo<br>Quentin Sprengelmeyer<br>Jeremy Lange<br>Kyubin Lee<br>Fred Boehm           | Statistics<br>Genetics<br>Genetics<br>Computer Sciences<br>Statistics                     |
| 2016 | April Peterson<br>Alessandra York   | Genetics<br>Genetics  |
| 2015 | René Welch  | Statistics  |
| 2014 | Shuyun Ye<br>Michelle Parmenter<br>Jeea Choi  | Statistics<br>Genetics<br>Statistics  |
| 2013 | Jianan Tian<br>Richard Wang<br>Shuang Huang<br>Raja Farhana Raja Mohd Anuar<br>Molly McDevitt | Statistics<br>Genetics<br>Statistics<br>Plant Breeding and Plant Genetics<br>Biochemistry |
| 2012 | Katie Clowers   | Genetics  |
| 2011 | Il Youp Kwak  | Statistics  |
| 2010 | Jee Young Moon<br>John Dawson<br>Elias Chaibub Neto<br>Qinglin Pei<br>Jingfang Zhang          | Statistics<br>Statistics<br>Statistics<br>Statistics<br>Oncology                          |
| 2008 | Beth Dumont   | Genetics  |

#### Oral Exams, Johns Hopkins University

|      |  |  |
|------|--|--|
| 2006 | Lindsey Garver<br>Benilton Carvalho<br>Yen-Yi Ho<br>Lindsey Enewold<br>Renee Gardner | Molecular Microbiology and Immunology<br>Biostatistics<br>Biostatistics<br>Epidemiology<br>Environmental Health Sciences |
| 2005 | Ani Manichaikul<br>Wenyi Wang<br>Meera Venkatesan<br>Audrey Grant                    | Biostatistics<br>Biostatistics<br>Molecular Microbiology and Immunology<br>Epidemiology                                  |
| 2004 | Katherine Swanson  | Molecular Microbiology and Immunology  |
| 2003 | Sadeep Shrestha<br>Wei-Min Chen  | Epidemiology<br>Biostatistics  |
| 2002 | Marie-Hélène Roy-Gagnon  | Epidemiology   |

|      |  |  |
|------|--|--|
| 2001 | Leslie Cope<br>Vivian Yuan<br>Jean-Paul Chretien | Mathematical Sciences (School of Engineering)<br>Mathematical Sciences (School of Engineering)<br>Epidemiology |
| 2000 | Xin Liu<br>Tsuo-Hung Lan<br>Halcyon Skinner      | Epidemiology<br>Epidemiology<br>Epidemiology   |
| 1999 | David Kaufman                                    | Epidemiology   |

#### Doctoral Thesis Defenses, University of Wisconsin–Madison

|      |  |  |
|------|--|--|
| 2020 | Thevaa Chandereng                              | Statistics                               |
| 2019 | Constanza Rojo<br>Fred Boehm<br>Molly McDevitt | Statistics<br>Statistics<br>Biochemistry |
| 2018 | Kyubin Lee<br>René Welch                       | Computer Sciences<br>Statistics          |
| 2017 | Richard Wang<br>Michelle Parmenter             | Genetics<br>Genetics                     |
| 2016 | Shuang Huang                                   | Statistics                               |
| 2015 | Jianan Tian<br>Katie Clowers                   | Statistics<br>Genetics                   |
| 2014 | Il-Youp Kwak                                   | Statistics                               |
| 2013 | Qinglin Pei                                    | Statistics                               |
| 2012 | John Dawson                                    | Statistics                               |
| 2011 | Michael White                                  | Genetics                                 |
| 2010 | Beth Dumont<br>Elias Chaibub Neto              | Genetics<br>Statistics                   |
| 2009 | YounJeong Choi                                 | Statistics                               |

#### Doctoral Thesis Defenses, Johns Hopkins University

|      |   |   |
|------|---|---|
| 2007 | Ani Manichaikul   | Biostatistics   |
| 2005 | Katherine Swanson<br>Laura LaRosa<br>Ji Wan Park<br>Martina Johannesson | Molecular Microbiology and Immunology<br>Environmental Health Sciences<br>Epidemiology<br>Lund University, Sweden |
| 2004 | Wei-Min Chen<br>Marie-Hélène Roy-Gagnon                                 | Biostatistics<br>Epidemiology   |

|      |                               |                              |
|------|-------------------------------|------------------------------|
| 2001 | Alison Klein<br>Tsuo-Hung Lan | Epidemiology<br>Epidemiology |
|------|-------------------------------|------------------------------|

Master's Thesis Defenses, University of Wisconsin–Madison

|      |                              |                                   |
|------|------------------------------|-----------------------------------|
| 2013 | Raja Farhana Raja Mohd Anuar | Plant Breeding and Plant Genetics |
|------|------------------------------|-----------------------------------|

Master's Thesis Reading, Johns Hopkins University

|      |  |  |
|------|--|--|
| 2001 | Jane Peredo, MS  | Genetic Counseling                           |
| 2000 | Jennifer Mulle, MHS<br>Heping Hu, MHS<br>Rita Peila, ScM | Epidemiology<br>Epidemiology<br>Epidemiology |

Classroom Instruction, University of Wisconsin–Madison

|              |                               |   |
|--------------|-------------------------------|---|
| Spring, 2020 | BMI 882<br>BMI 826-001        | Biomedical Data Science Scholarly Literature 2 ( <i>new</i> )<br>Advanced Data Analysis ( <i>new</i> )  |
| Fall, 2019   | BMI 881                       | Biomedical Data Science Scholarly Literature 1 ( <i>new</i> )   |
| Spring, 2019 | Statistics 877                | Statistical Methods in Molecular Biology<br>(jointly with Drs. Kendzierski, Lu, Dewey, Newton,<br>Keles, Roy, Ané, and Tang)  |
| Spring, 2018 | Agronomy 957                  | Plant Breeding and Plant Genetics seminar<br>(jointly with Brian Yandell)   |
| Spring, 2017 | Statistics 877                | Statistical Methods in Molecular Biology<br>(jointly with Drs. Kendzierski, Larget, Ané, Newton,<br>Roy, Keles, Wang, and Craven)   |
| Spring, 2016 | BMI 826-003                   | Tools for Reproducible Research   |
| Spring, 2015 | BMI 826-003                   | Tools for Reproducible Research   |
| Spring, 2014 | BMI 826-003<br>Statistics 877 | Tools for Reproducible Research ( <i>new</i> )<br>Statistical Methods in Molecular Biology<br>(jointly with Drs. Newton, Kendzierski, Larget, Ané,<br>Yandell, Wang, and Keles) |
| Fall, 2012   | BMI 826-001                   | Statistical Methods for QTL Mapping   |
| Spring, 2012 | Statistics 877                | Statistical Methods in Molecular Biology<br>(jointly with Drs. Newton, Kendzierski, Larget, Ané,<br>Yandell, Wang, and Keles)   |
| Spring, 2011 | Statistics 992-001            | Statistical Methods for QTL Mapping ( <i>new</i> )  |
| Summer, 2010 | Population Health 904-003     | Analytic Methods in Genetic Epidemiology<br>(jointly with Drs. Engelman, Payseur, and Meyers)   |

|              |                           |  |
|--------------|---------------------------|--|
| Spring, 2010 | Statistics 877            | Statistical Methods in Molecular Biology<br>(jointly with Drs. Newton, Kendzierski, Larget, Ané,<br>Yandell, Wang, and Keles)          |
| Fall, 2008   | Statistics 371-003        | Introductory Applied Statistics for the Life Sciences  |
| Summer, 2008 | Population Health 904-003 | Analytic Methods in Genetic Epidemiology<br>(jointly with Drs. Engelman, Payseur, and Skinner)   |
| Spring, 2008 | Statistics 992-002        | Statistical Methods in Molecular Biology ( <i>new</i> )<br>(jointly with Drs. Newton, Kendzierski, Larget, Ané,<br>Yandell, and Keles) |

#### Classroom Instruction, Johns Hopkins University

|             |   |   |
|-------------|---|---|
| 2006 – 2007 | Biostatistics 140.668   | Special Topics in Genetics and Genomics   |
| 2005 – 2006 | Biostatistics 140.615–616<br>Epidemiology 340.631   | Statistics for Laboratory Scientists<br>Methods in Genetic Epidemiology I<br>(jointly with Dr. Beaty)   |
| 2004 – 2005 | Biostatistics 140.776<br><br>Biostatistics 140.668<br><br>Biostatistics 140.615–616<br>Epidemiology 340.631 | Statistical Computing<br>(jointly with Drs. Caffo, Irizarry, and Ruczinski)<br>Special Topics in Genetics and Genomics<br>(jointly with Dr. Ruczinski)<br>Statistics for Laboratory Scientists<br>Methods in Genetic Epidemiology I<br>(jointly with Dr. Beaty) |
| 2003 – 2004 | Biostatistics 140.776<br><br>Biostatistics 140.615–616  | Statistical Computing ( <i>new</i> )<br>(jointly with Drs. Caffo, Irizarry, and Ruczinski)<br>Statistics for Laboratory Scientists  |
| 2002 – 2003 | Biostatistics 140.668<br><br>Biostatistics 140.615–616  | Special Topics in Genetics and Genomics ( <i>new</i> )<br>(jointly with Dr. Parmigiani)<br>Statistics for Laboratory Scientists   |
| 2001 – 2002 | Biostatistics 140.615   | Statistics for Laboratory Scientists ( <i>new</i> )   |
| 2000 – 2001 | Biostatistics 140.667<br>Biostatistics 140.667<br>Biostatistics 140.668                                     | Advanced Statistical Computing ( <i>new</i> )<br>Genetics for Statisticians<br>Statistical Genetics   |
| 1999 – 2000 | Biostatistics 140.846<br>Biostatistics 140.668  | Genetics for Statisticians ( <i>new</i> )<br>Statistical Genetics ( <i>new</i> )  |

#### Classroom Instruction, University of California, Berkeley

|              |                 |  |
|--------------|-----------------|--|
| Summer, 1994 | Statistics 131A | Introductory Statistics for Social and Life Scientists |
|--------------|-----------------|--|

#### Classroom Instruction, University of Wisconsin–Milwaukee

|             |                 |               |
|-------------|-----------------|---------------|
| 1991 – 1992 | Mathematics 095 | Basic Algebra |
|-------------|-----------------|---------------|

## Other teaching

|             |   |
|-------------|---|
| 2020        | Lectures on “Steps toward reproducible research” and “Exploratory data analysis” in BMI 773 (Clinical Research Informatics), Department of Biostatistics & Medical Informatics, University of Wisconsin–Madison |
| 2019        | Lecture on “Steps toward reproducible research” to MD/PhD students, School of Medicine and Public Health, University of Wisconsin–Madison   |
| 2018 – 2019 | Lecture on “Data management” to KL2 scholars, Institute for Clinical and Translational Research, School of Medicine and Public Health, University of Wisconsin–Madison  |
| 2016 – 2018 | Instructor, Data Carpentry workshops, Advanced Computing Initiative, University of Wisconsin–Madison  |
| 2017 – 2018 | Workshop on Reproducible Research, Summer Institute in Statistics for Big Data, Seattle, Washington   |
| 2013 – 2018 | Lecture on “Creating effective figures and tables” to MD/PhD students, School of Medicine and Public Health, University of Wisconsin–Madison  |
| 2018        | Instructor, Workshop on Advanced R and R/qtl, ICRISAT, Hyderabad, India   |
| 2018        | Lecture on “Steps toward reproducible research” for the Cellular and Molecular Pathology Graduate Program, University of Wisconsin–Madison  |
| 2017        | Instructor, Data Carpentry workshop, National Society of Black Engineers Professional Development Conference, Chicago, Illinois   |
| 2017        | Workshop on Systems Genetics of Neurodegeneration, Frauenchiemsee, Germany  |
| 2017        | Workshop on R/qtl and R/qtl2 software, Complex Trait Community meeting, Memphis, Tennessee  |
| 2017        | Workshop on “Steps toward reproducible research” as part of a Data Science and Plant Breeding Simulation Workshop, University of Minnesota, St. Paul, Minnesota   |
| 2017        | Lecture to AP Statistics students, Madison East High School, Madison, Wisconsin   |
| 2008 – 2017 | Periodic seminars on “Creating effective figures and tables” in the Department of Pathology and Laboratory Medicine, University of Wisconsin–Madison  |
| 2008 – 2017 | Lecture on my consulting experiences in Statistical Consulting (Stat 998), Department of Statistics, University of Wisconsin–Madison  |
| 2008 – 2016 | Instructor and co-organizer, Short Course on Systems Genetics, The Jackson Laboratory, Bar Harbor, Maine  |
| 2016        | Lecture on “Creating effective figures and tables” at the Demography Training Seminar, Center for Demography of Health and Aging, University of Wisconsin–Madison   |
| 2015        | R/qtl workshop, Texas A&M, College Station, Texas   |

|             |   |
|-------------|---|
| 2015        | Lecture on “Reproducible Research” for undergraduate researchers in the Summer Institute for Training in Biostatistics (SIBS), University of Wisconsin–Madison  |
| 2014 – 2015 | Instructor, Software Carpentry workshops, Advanced Computing Initiative, University of Wisconsin–Madison  |
| 2015        | Instructor, Software Carpentry workshop, Washington State University, Pullman, Washington   |
| 2014        | Lecture on “Creating effective figures and tables” in a manuscript writing workshop, Institute for Clinical and Translational Research, University of Wisconsin–Madison                               |
| 2013        | Lecture on “A brief introduction to git and GitHub” to graduate students, Department of Statistics, University of Wisconsin–Madison   |
| 2013        | Lecture on “Why aren’t all of our graphs interactive?” to graduate students in the Biostatistics Training Program, Department of Biostatistics & Medical Informatics, University of Wisconsin–Madison |
| 2012        | Instructor, Training Course on Field Trials & QTL Analysis using R and R/qtl, ICRIAT, Hyderabad, India  |
| 2012        | Lecture on “Introduction to QTL mapping in model organisms” for undergraduate researchers in the Summer Institute for Training in Biostatistics (SIBS), University of Wisconsin–Madison               |
| 2012        | Lecture on “Programming style” to graduate students in the Biostatistics Training Program, Department of Biostatistics & Medical Informatics, University of Wisconsin–Madison                         |
| 2010        | Lecture on “How to give a scientific presentation” to graduate students in the Biostatistics Training Program, Department of Biostatistics & Medical Informatics, University of Wisconsin–Madison     |
| 2008        | Lecture on “Recombination and linkage” in Human Emphasis Group Graduate Student Seminar (NS 881, Schoeller), Nutritional Sciences, University of Wisconsin–Madison                                    |
| 2008        | Lecture on “Recombination and linkage” in Genetic Epidemiology (PHS 904, Engelman), Population Health Sciences, University of Wisconsin–Madison   |
| 2007        | Instructor, NeuroproMiSe Training Course in Genetic Analysis and Bioinformatics, Lund University, Lund, Sweden  |
| 2001 – 2007 | Instructor and co-organizer, Short Course on Complex Trait Analysis, The Jackson Laboratory, Bar Harbor, Maine  |
| 2000 – 2007 | Lecture on quantitative genetics in Advanced Topics in Human Genetics (Reeves and Feinberg) Human Genetics, Johns Hopkins School of Medicine  |
| 2004 – 2006 | Lecture on “Statistical epigenomics” in Epigenetics (ME260.710, Feinberg), Johns Hopkins University School of Medicine  |
| 2003 – 2006 | Lecture on “Experimental design and sample size determination for animal-based research”, Johns Hopkins University Animal Care and Use Committee seminar series                                       |

|             |   |
|-------------|---|
| 2002 – 2006 | Instructor, QTL Mapping II module, Summer Institute in Statistical Genetics, formerly at North Carolina State University, now held at the University of Washington, Seattle |
| 2003 – 2005 | Lecture on “Perl for human linkage analysis” in Biocomputing I: Perl for Biocomputing (140.636, Pineda), Johns Hopkins Bloomberg School of Public Health                    |
| 2004        | Lecture on experimental design, statistics, and sample size determination, as part of an on-line course on Enhancing Humane Science—Improving Animal Research               |
| 1999 – 2000 | Special studies course in longitudinal data analysis for Xin Liu, PhD candidate, Epidemiology   |

## ACADEMIC LEADERSHIP AND PROGRAM DEVELOPMENT

|             |  |
|-------------|--|
| 2017 – 2020 | Director, Biomedical Data Science PhD Program, University of Wisconsin–Madison   |
| 2004 – 2007 | Co-Director, MHS Program in Bioinformatics, Department of Biostatistics, Johns Hopkins Bloomberg School of Public Health |

## SERVICE ACTIVITIES

### International and National

|             |   |
|-------------|---|
| 2017        | Program Committee, Complex Trait Community 15 <sup>th</sup> Annual Meeting (Memphis, Tennessee)                                 |
| 2016 – 2017 | John M. Chambers Statistical Software Award Committee, Statistical Computing Section, American Statistical Association          |
| 2013 – 2014 | Personalized Medicine Research Project (PMRP) Oversight Committee, Marshfield Clinic Research Foundation, Marshfield, Wisconsin |
| 2013        | Co-organizer, Complex Trait Community 12 <sup>th</sup> Annual Meeting (Madison, Wisconsin)                                      |
| 2003 – 2004 | ENAR Distinguished Student Paper Awards Committee   |
| 2003        | IMS Contributed Papers Chair, ENAR/IMS Annual Meeting (Tampa, Florida)  |

### University

|                |   |
|----------------|---|
| 2020– present  | Executive Committee, Plant Breeding and Plant Genetics PhD Program, University of Wisconsin–Madison                                 |
| 2017 – present | Faculty Senator, University of Wisconsin–Madison  |
| 2012 – present | Steering Committee, Medical Scientist Training Program, School of Medicine and Public Health, University of Wisconsin–Madison       |
| 2018           | Review Committee for Biometry Master of Science Program, College of Agricultural and Life Sciences, University of Wisconsin–Madison |



|             |   |
|-------------|---|
| 2016        | Genomics Advisory Committee, School of Medicine and Public Health, University of Wisconsin–Madison                          |
| 2012 – 2015 | Faculty Advisory Committee, School of Medicine and Public Health, University of Wisconsin–Madison                           |
| 2011 – 2015 | University Library Committee, University of Wisconsin–Madison ( <i>Chair</i> , 2014 – 2015)                                 |
| 2009 – 2012 | Master of Public Health Program Curriculum Committee, School of Medicine and Public Health, University of Wisconsin–Madison |
| 2009 – 2012 | Curriculum Planning Committee, Biological Sciences Division, University of Wisconsin–Madison                                |
| 2008 – 2012 | Faculty Senator, University of Wisconsin–Madison  |
| 2002 – 2007 | Maintainer of the Faculty Senate web site, Johns Hopkins Bloomberg School of Public Health                                  |
| 2001 – 2004 | Faculty Senate representative to the Committee on Information Technology, Johns Hopkins Bloomberg School of Public Health   |
| 2001 – 2003 | Organizer of a monthly discussion forum for junior faculty, Johns Hopkins Bloomberg School of Public Health                 |
| 2001 – 2002 | Secretary of the Faculty Senate, Johns Hopkins Bloomberg School of Public Health  |
| 2000 – 2002 | Faculty Senator, Johns Hopkins Bloomberg School of Public Health  |
| 2000 – 2001 | Biochemistry and Molecular Biology Strategic Plan Committee, Johns Hopkins Bloomberg School of Public Health                |

#### Departmental

|                |   |
|----------------|---|
| 2015 – present | Scientific Advisory and Steering Committee, Biostatistics Computing Group, Department of Biostatistics and Medical Informatics, University of Wisconsin–Madison |
| 2014 – present | Steering Committee, Biomedical Data Science MS Program, Department of Biostatistics and Medical Informatics, University of Wisconsin–Madison                    |
| 2010 – 2020    | Chair, Education and Curriculum Committee, Department of Biostatistics and Medical Informatics, University of Wisconsin–Madison                                 |
| 2015 – 2016    | Co-chair, Faculty Search Committee, Biostatistics and Medical Informatics, University of Wisconsin–Madison  |
| 2010 – 2013    | Seminar organizer, Department of Biostatistics and Medical Informatics, University of Wisconsin–Madison   |
| 2010 – 2012    | Steering Committee, Biomedical Computing Group, Department of Biostatistics and Medical Informatics, University of Wisconsin–Madison                            |
| 2008           | Committee for Information Technology Assessment, Department of Biostatistics and Medical Informatics, University of Wisconsin–Madison                           |

|             |  |
|-------------|--|
| 2004 – 2007 | Intellectual and Social Environment Committee, Department of Biostatistics, Johns Hopkins Bloomberg School of Public Health  |
| 2000 – 2002 | Biostatistics Information Technology Committee, Department of Biostatistics, Johns Hopkins Bloomberg School of Public Health |
| 2000 – 2001 | Seminar organizer, Department of Biostatistics, Johns Hopkins Bloomberg School of Public Health                              |

## GRANT SUPPORT

### Current Grant Support

|  |                     |                    |
|--|---------------------|--------------------|
| System Genetic Analysis of Multi-Parent Crosses<br>co-PI with Gary Churchill (Jackson Laboratory)<br><i>Develop statistical methods and software for the analysis of multi-parent crosses, such as the mouse Diversity Outcross population and the Collaborative Cross.</i><br>Role: Co-Principal investigator   | 07/01/15 – 07/31/23 | NIH/NIGMS<br>(25%) |
| NIAID Centers of Excellence for Influenza Research and Surveillance<br>Yoshihiro Kawaoka, PI<br><i>In a genetics study with Diversity Outbred (DO) mice, identify host genes that, in the context of a functional Mx1 gene, affect the outcome of H5N1 influenza virus infections.</i><br>Role: Co-investigator  | 04/01/14 – 08/31/20 | NIH/NIAID<br>(8%)  |
| A Program of Research in Population Cytogenetics<br>Terry Hassold (Washington State), PI<br><i>Study meiosis in human oocytes and spermatocytes to examine the way in which homologous chromosomes find and synapse with each other and how these processes relate to the formation of crossovers, and to compare the recombination processes between human males and females, including the contribution of chromatin structure and interference to sex-specific differences in recombination rates.</i><br>Role: Co-investigator | 12/01/10 – 07/31/20 | NIH/NICHD<br>(8%)  |
| Collaborative Cross of the Microbiome and Metabolic Disease<br>Federico Rey, PI<br><i>Identify genes and pathways that modulate gut microbial composition and abundance, and their association to disease, in the mouse Diversity Outcross.</i><br>Role: Co-investigator   | 09/23/15 – 08/31/20 | NIH/NIDDK<br>(5%)  |
| Genetics of the Island Rule<br>Bret Payseur, PI<br><i>This project aims to functionally characterize and fine-map quantitative trait loci (QTL) for body size in Gough Island mice and map QTL for extreme body size evolution in a second island population from Papa Westray.</i><br>Role: Co-investigator   | 09/10/12 – 02/28/21 | NIH/NIGMS<br>(5%)  |

- Evolution of the Genome-wide Recombination Rate in Mice  
 Bret Payseur, PI 05/15/17 – 03/31/21 NIH/NIGMS (5%)  
*Develop a portrait of natural genetic variation in recombination rate across multiple evolutionary scales by measuring polymorphism and divergence in genome-wide recombination rate during oogenesis and spermatogenesis, and by profiling natural genetic variation in molecular processes that lead to crossovers, including the generation of double-strand breaks.*  
 Role: Co-investigator
- A Unified High-Performance Web Service for Systems Genetics and Precision Medicine  
 Robert W. Williams and Saunak Sen, PIs 04/15/17 – 03/31/21 NIH/NIGMS (10%)  
*Develop and improve the web services framework GeneNetwork 2, a modular high-performance computational resource that provides statistical and genetic tools to analyze and integrate massive omics datasets jointly with information on disease risk and severity.*  
 Role: Co-investigator
- Previous Grant Support
- Alexander Disease: Mechanisms, Modifiers, and Therapeutics  
 Albee Messing, PI 09/20/14 – 07/31/19 NIH/NIHD (5%)  
*Identify genomic regions, and ultimately specific genes, that contribute to GFAP accumulation and toxicity in a mouse model of Alexander disease.*  
 Role: Co-investigator
- The Collaborative Cross Project of Diabetes  
 Alan Attie, PI 04/01/14 – 01/31/19 NIH/NIDDK (5%)  
*Identify genes involved in type 2 diabetes using two mouse populations derived from the same set of eight founder strains: the Diversity Outcross and the Collaborative Cross. The project includes detailed phenotyping to identify genes and pathways associated with beta cell functions.*  
 Role: Co-investigator
- Genome Dynamics: Evolution, Organization, and Function  
 Gary Churchill (Jackson Laboratory), PI 04/01/06 – 06/30/16 NIH/NIGMS (9%)  
*In a project led by Petko Petkov and Ken Paigen, characterize recombination by detailed mapping of recombination events on a single chromosome in a larger mouse backcross.*  
 Role: Co-Investigator
- Statistical Methods for Analysis and Integration in Genomic Studies of Disease  
 Christina Kendzierski, PI 08/01/12 – 04/30/16 NIH/NIGMS (7%)  
*This project aims to develop and disseminate statistical methods to address challenges that arise in genomic based studies of disease, with particular focus on methods that integrate data across multiple platforms and scales to both identify as well as comprehensively characterize genomic features affecting an individual's disease course and/or likelihood of response to treatment.*  
 Role: Co-investigator
- Systems Genetic Analysis of Methamphetamine's Motivational Effects in Mouse AIL  
 Abraham Palmer (U Chicago), PI 07/01/11 – 12/31/15 NIH/NIDA (10%)  
*Investigate the genetic underpinnings of the methamphetamine preference in mouse advanced intercross lines (AIL) and develop improved statistical methods and software for system genetics analysis in AIL.*  
 Role: Co-investigator
- Statistical Methods and Software for QTL Mapping  
 Karl Broman, PI 06/01/05 – 05/31/15 NIH/NIGMS (30%)  
*Develop improved model selection methods of multiple QTL mapping in experimental crosses, develop improved methods for the analysis of recombinant inbred lines and related strains, develop and disseminate the R/qtl software for QTL mapping.*  
 Role: Principal Investigator

- Genes and Gene Networks Associated with Obesity and Diabetes  
 Alan Attie (UW–Madison), PI 12/01/09 – 11/30/14 NIH/NIDDK (5%)  
*Identify genes and gene networks that play a role in the development of obesity-induced type 2 diabetes in a large mouse intercross with detailed clinical phenotypes and gene expression data on multiple tissues.*  
 Role: Co-investigator
- Genetic Complexity and Modifiers of Hirschsprung Disease  
 Michelle Southard-Smith (Vanderbilt University), PI 07/01/07 – 06/30/12 NIH/NIDDK (8%)  
*The goal of the proposed studies is to identify additional genes and gene interactions that impact aganglionosis in the Sox10<sup>Dom</sup> model.*  
 Role: Co-Investigator
- Statistical Methods for Experimental Genome Populations  
 Saunak Sen (UCSF), PI 07/01/07 – 06/30/12 NIH/NIGMS (10%)  
*The goal of this proposed research is to develop statistical design and analysis methods that will reduce experimental cost, make efficient use of existing resources, and better infer causation when we have incomplete control over the assignment of genetic factors to individual organisms.*  
 Role: Co-Investigator
- Genetic Basis of WNV Competence in *Culex tarsalis*  
 Jason Rasgon (Johns Hopkins University), PI 07/01/07 – 10/31/11 NIH/NIAID (2%)  
*Identify genetic loci contributing to variation in West Nile virus vector competence in susceptible and refractory colonies of Culex tarsalis.*  
 Role: Co-Investigator
- Genetic Basis of Nanophthalmos and Axial Hyperopia  
 Olof Sundin (Texas Tech), PI 09/01/09 – 08/31/11 NIH/NEI (10%)  
*Investigate the genetic and phenotypic diversity of extreme hyperopia, and identify common hypomorphic alleles of MFRP, the gene that causes nanophthalmos, and determine their effect on ocular structure.*  
 Role: Co-investigator
- Mechanism of Inflammation-Induced Airway Hyperactivity  
 Wayne Mitzner (Johns Hopkins University), PI 12/01/04 – 6/30/07 NIH/NHLBI (3%)  
*Identify genetic loci contributing to variation in inflammation-induced airway hyperactivity in mice.*  
 Role: Co-Investigator
- Center for Epigenetics of Common Human Diseases  
 Andrew Feinberg, PI 04/01/04 – 06/30/07 NIH/NHGRI (10%)  
*Develop tools for medical epigenetics, including epigenome discovery, its quantitative analysis, and its application to medicine.*  
 Role: Co-Investigator
- Epigenetic Variation and its Determinants in Depression  
 James Potash, PI 04/01/05 – 06/30/07 NIH/NIMH (10%)  
*Establish the connection between genetic, environmental, and epigenetic factors and susceptibility to depression.*  
 Role: Co-Investigator
- Genetic Mechanisms of Autoimmune Myocarditis  
 Noel Rose, PI 07/01/04 – 06/30/07 NIH/NHLBI (4%)  
*Identify genetic loci contributing to susceptibility to autoimmune myocarditis in mice.*  
 Role: Co-Investigator

|   |                     |                    |
|---|---------------------|--------------------|
| Catechol-O-methyltransferase and Breast Cancer<br>James Yager, PI<br><i>The goal of this project is to conduct a rigorous experimental investigation of the hypothesis that decreased COMT activity results in increased DNA damage that contributes to increased cell transformation and breast cancer.</i><br>Role: Co-Investigator | 09/21/04 – 06/30/07 | NIH/NCI<br>(2.5%)  |
| Core Center Grant: Biostatistical Center<br>Sheila West, PI<br><i>Provide biostatistics support for epidemiological research in ophthalmology.</i><br>Role: Senior Biostatistician  | 07/01/04 – 06/30/07 | NIH/NEI<br>(5%)    |
| Older Americans Independence Center<br>Linda Fried, PI<br><i>The Center is dedicated to developing the next generation of research to determine the causes and treatments for frailty in older adults.</i><br>Role: Advisory Board Member   | 06/01/03 – 06/30/07 | NIH/NIA<br>(1.5%)  |
| Statistical Methods for Genetic Epidemiology<br>Kung-Yee Liang, PI; Karl Broman, acting PI<br><i>Develop and implement new statistical methodology useful for genetic epidemiologic studies of complex chronic diseases.</i><br>Role: Co-Investigator   | 12/01/00 – 11/30/05 | NIH/NIGMS<br>(25%) |
| Portable Software for Mapping Quantitative Traits<br>Ken Manly, PI<br><i>Design and test a graphical user interface for software R/qtl and ensure that the GUI makes the proper connections with the core program.</i><br>Role: Co-Investigator   | 09/24/04 – 08/31/05 | NIH/NHGRI<br>(5%)  |
| Center for Craniofacial Development and Disorders<br>Terri Beaty, PI<br><i>Biostatistical Core for program project on the genetics of craniofacial disorders.</i><br>Role: Co-Investigator  | 08/01/01 – 08/01/04 | NIH/NIDR<br>(5%)   |
| Mouse QTL in Endotoxic Shock<br>Roger Reeves, PI<br><i>Identify genomic regions contributing to susceptibility to endotoxic shock in mice.</i><br>Role: Co-Investigator   | 08/01/01 – 07/30/05 | NIH<br>(10%)       |
| Genetic Basis of Nanophthalmos<br>Olof Sundin, PI<br><i>Identify the gene responsible for nanophthalmos in a single large pedigree.</i><br>Role: Co-Investigator  | 08/15/01 – 06/30/04 | NIH/NEI<br>(10%)   |
| Center for Craniofacial Development and Disorders<br>Ethylin Jabs, PI<br><i>Map and identify genes contributing to susceptibility to craniofacial disorders by linkage in multiplex families.</i><br>Role: Co-Investigator  | 08/01/99 – 04/30/04 | NIH/NIDR<br>(10%)  |
| The Genetics of Age Related Cataract in Salisbury<br>Nathan Congdon, PI<br><i>Identify genes contributing to susceptibility to cataract</i><br>Role: Co-Investigator  | 09/30/00 – 08/31/03 | NIH/NIA<br>(10%)   |

JHSPH Faculty Innovation Fund grant

Karl Broman, PI

05/01/01 – 04/30/02

JHSPH

(30%)

*Applications of tree-based models to identify epistatic interactions between QTLs in model organisms.*

Role: Principal Investigator

## INVITED PRESENTATIONS

### Scientific Meetings

- 2019 RStudio Conference, Austin, Texas  
American Association for the Advancement of Science (AAAS) annual meeting, Washington, DC  
Michigan State Plant Breeding, Genetics, and Biotechnology (PBGB) Symposium, East Lansing, Michigan
- 2018 Complex Trait Community meeting, Glasgow, Scotland  
Purdue Symposium on Statistics, West Lafayette, Indiana
- 2017 Complex Trait Community meeting, Memphis, Tennessee
- 2016 Genome and Gene Mapping Satellite, Queenstown Research Week, Nelson, New Zealand  
Joint Statistical Meetings, Chicago, Illinois  
Conference on Learning Tools to Promote Reproducible Research and Open Science, Chicago Chapter,  
American Statistical Association, Chicago, Illinois
- 2015 Plant breeding symposium, Texas A&M, College Station, Texas  
Joint Statistical Meetings, Seattle, Washington  
BioC 2015 (Bioconductor annual meeting), Seattle, Washington  
Complex Trait Community annual meeting, Portland, Oregon  
The Challenge of Inference from Genome to Phenome, CSIRO Chief Executive Cutting Edge Symposium,  
Brisbane, Australia  
American Association for the Advancement of Science (AAAS) annual meeting, San Jose, California
- 2014 Fourth Symposium on Biological Data Visualization, Boston, Massachusetts  
Scholarly Publishing Symposium, University of Wisconsin–Madison
- 2013 Open Access, Open Data @ UW, University of Wisconsin–Madison  
Workshop on MAGIC-type populations, Cambridge, United Kingdom  
Kansas State University Plant Breeding and Genetics Symposium, Manhattan, Kansas  
International Biometric Society/ENAR Annual Meeting, Orlando, Florida
- 2012 EvoSysBio meeting, Wisconsin Institutes for Discovery, University of Wisconsin – Madison  
EURATRANS annual meeting, Tutzing, Germany
- 2011 Quantitative Biology and Bioinformatics in Modern Medicine, Dublin, Ireland
- 2010 Fourteenth QTL-MAS Workshop, Poznań, Poland
- 2008 Emerging Statistical Challenges in Genome and Translational Research, Banff, Canada
- 2007 Systems Medicine Workshop, NHLBI, Bethesda, Maryland
- 2005 Fifth Australasian Human Gene Mapping Conference, Mt. Buller, Australia  
Joint Statistical Meetings, Minneapolis, Minnesota  
CSPS/IMS Joint Meeting, Beijing, China

- 2004 Taipei Symposium on Statistical Genomics, Academia Sinica, Taipei, Taiwan  
 Seventh Annual Conference on Computational Genomics, Reston, Virginia  
 Complex Trait Consortium Third Annual Meeting, Bar Harbor, Maine  
 Nobel Symposium on Epigenetic Reprogramming in Development and Disease, Stockholm, Sweden  
 Workshop on the Analysis of Complex Genetic Traits, Mathematical Sciences Research Institute,  
 Berkeley, California
- 2002 Royal Statistical Society, London, England
- 2001 Classification Society of North America meeting, St. Louis, Missouri  
 Modifier Analysis in Cancer Genetics of Experimental Mammals Workshop, Madison, Wisconsin
- 1996 WNAR/IMS Western Regional Conference, Pullman, Washington

### Seminars

- 2019 Providence/Boston Center for AIDS Research Biostatistics Core, Boston University  
 Department of Mathematics, Statistics, and Computer Science, St. Olaf College, Northfield, Minnesota
- 2018 Department of Statistics, Colorado State University, Fort Collins, Colorado  
 qBio seminar series, Wisconsin Institute for Discovery, University of Wisconsin–Madison  
 BBC seminar series, University of California, San Francisco
- 2017 Department of Bioinformatics and Genomics, University of North Carolina at Charlotte  
 Berkeley Institute for Data Science, University of California, Berkeley  
 Genetics Program, North Carolina State University, Raleigh, North Carolina
- 2016 Department of Genetics, Genomics, and Informatics, University of Tennessee Health Science Center,  
 Memphis, Tennessee  
 Department of Statistics, University of Auckland, Auckland, New Zealand  
 Department of Biological Statistics and Computational Biology, Cornell University, Ithaca, New York  
 Graduate Researchers interested in Data (GRiD), University of Massachusetts, Amherst, Massachusetts  
 Bioinformatics and Computational Biology, Genentech, South San Francisco, California
- 2015 Holz Series in Research Data Management, University of Wisconsin–Madison  
 Division of Biostatistics, Department of Preventive Medicine, University of Tennessee Health Science  
 Center, Memphis, Tennessee  
 Bioinformatics Division, Walter & Eliza Hall Institute for Medical Research, Melbourne, Australia
- 2014 Delta Program, University of Wisconsin–Madison  
 Department of Biostatistics, Harvard School of Public Health, Boston, Massachusetts  
 Danforth Plant Science Center, St. Louis, Missouri
- 2013 Graphics Working Group, Department of Statistics, Iowa State University, Ames, Iowa
- 2012 Department of Biostatistics, Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland
- 2011 Department of Biostatistics, University of Washington, Seattle  
 Department of Statistics, George Mason University, Fairfax, Virginia  
 Groningen Bioinformatics Centre, University of Groningen, Groningen, The Netherlands  
 Department of Biostatistics, Columbia University, New York
- 2010 Institute of Mathematics and Computer Sciences, Wrocław University of Technology, Wrocław, Poland  
 Department of Genetics and Animal Breeding, Wrocław University of Environmental and Life Sciences,  
 Wrocław, Poland

- Quantitative Biology and Modeling Initiative Program, Michigan State University, East Lansing, Michigan  
 Integrative Genomics Seminar Series, Vanderbilt University, Nashville, Tennessee  
 Evolution Seminar Series, University of Wisconsin–Madison  
 Curriculum in Genetics and Molecular Biology, University of North Carolina at Chapel Hill
- 2009 Department of Human Genetics, University of California, Los Angeles  
 Laboratory of Genetics, University of Wisconsin–Madison  
 Department of Statistics, University of Wisconsin–Madison  
 Department of Biostatistics & Medical Informatics, University of Wisconsin–Madison  
 Groningen Bioinformatics Centre, University of Groningen, Groningen, The Netherlands  
 Wellcome Trust Centre for Human Genetics, Oxford, United Kingdom
- 2008 Annual Retreat, Genomic Sciences Training Program, University of Wisconsin–Madison  
 Division of Human Genetics, Cincinnati Children’s Hospital, Cincinnati, Ohio  
 Computation and Informatics in Biology and Medicine (CIBM), University of Wisconsin–Madison  
 Evolution Seminar Series, University of Wisconsin–Madison  
 Department of Animal Sciences, University of Wisconsin–Madison
- 2007 Department of Human Genetics, University of Chicago  
 Department of Biostatistics, Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland  
 Statistics Program, St. Olaf College, Northfield, Minnesota  
 Center for Interdisciplinary Research, St. Olaf College, Northfield, Minnesota  
 Annual Retreat, Laboratory of Genetics, University of Wisconsin–Madison  
 Division of Statistics, Northern Illinois University, DeKalb, Illinois  
 Department of Biostatistics and Medical Informatics, University of Wisconsin–Madison  
 Department of Human Genetics, University of California, Los Angeles  
 Department of Statistics, University of California, Berkeley  
 The Jackson Laboratory, Bar Harbor, Maine  
 Department of Biostatistics, University of Michigan, Ann Arbor
- 2006 Institute of Genetic Medicine, Johns Hopkins University School of Medicine, Baltimore, Maryland  
 Department of Biostatistics, University of Michigan, Ann Arbor  
 Laboratory of Genetics, University of Wisconsin–Madison  
 Department of Biostatistics, University of Washington, Seattle
- 2005 Department of Statistics, University of California, Davis  
 Department of Genetics, School of Medicine, University of Pennsylvania, Philadelphia  
 Department of Mathematics and Statistics, University of Maryland, Baltimore County  
 Department of Epidemiology, Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland  
 Section for Medical Inflammation Research, Department of Cell and Molecular Biology, Lund University, Lund, Sweden
- 2004 Department of Biostatistics, Yale University, New Haven, Connecticut  
 Marshfield Clinic Research Foundation, Marshfield, Wisconsin  
 Genetics and Genomic Biology, Hospital for Sick Children, Toronto, Canada  
 Genetic Interest Group, Center for Human Genetic Research, Vanderbilt University, Nashville, Tennessee  
 Department of Biostatistics, University of Buffalo  
 Immunogenetics, Universität Rostock, Germany  
 Department of Epidemiology and Biostatistics, Memorial Sloan–Kettering Cancer Center, New York
- 2003 Departments of Statistics and Biostatistics & Medical Informatics, University of Wisconsin–Madison  
 Department of Statistics, University of California, Los Angeles  
 Department of Mathematics, Haverford College, Pennsylvania



Department of Biostatistics, University of North Carolina, Chapel Hill  
 Department of Biostatistics, University of California, San Francisco

- 2002    Section on Statistical Genetics, University of Alabama, Birmingham  
          Department of Statistics, University of California, Berkeley  
          Department of Biostatistics, Johns Hopkins University  
          Department of Molecular and Cellular Biology, Roswell Park Cancer Institute, Buffalo, New York  
          Department of Mathematics and Statistics, American University, Washington, DC
- 2001    Department of Statistics, Yale University  
          Department of Mathematical Sciences, University of Wisconsin–Milwaukee
- 2000    Biometric Research Branch, National Cancer Institute, Bethesda, Maryland  
          The Jackson Laboratory, Bar Harbor, Maine
- 1999    Department of Biostatistics, Johns Hopkins University  
          Department of Biostatistics, University of Washington, Seattle  
          Gemini Research, Cambridge, England  
          Department of Biostatistics, Johns Hopkins University  
          Department of Statistics, University of California, Berkeley  
          Department of Molecular and Cell Biology, University of California, Berkeley
- 1998    Walter and Eliza Hall Institute of Medical Research, Melbourne, Australia  
          Queensland Institute for Medical Research, Brisbane, Australia  
          Walter and Eliza Hall Institute of Medical Research, Melbourne, Australia  
          deCODE Genetics, Reykjavik, Iceland  
          Biostatistics Department, University of Michigan, Ann Arbor  
          Department of Statistics, University of California, Berkeley  
          Department of Mathematical Sciences, University of Wisconsin–Milwaukee
- 1997    Department of Statistics, University of Chicago  
          Department of Statistics, University of Wisconsin–Madison  
          Department of Statistics, University of California, Berkeley  
          Department of Statistics, Stanford University, Palo Alto, California