CURRICULUM VITAE

Karl W. Broman

Department of Biostatistics and Medical Informatics School of Medicine and Public Health University of Wisconsin–Madison 2126 Genetics-Biotechnology Center 425 Henry Mall Madison, Wisconsin 53706

Phone: 608-262-4633 Email: broman@wisc.edu Web: https://kbroman.org

ORCID: 0000-0002-4914-6671

EDUCATION

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, Summa Cum Laude, Mathematics, University of Wisconsin-Milwaukee

PROFESSIONAL POSITIONS

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)

Dispersity renowship, Oniversity of Camo

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, <i>Journal of the American Statistical Association</i> , 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

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 S (2009) A Guide to OTL Mapping with R/qtl. Springer (ISBN: 978-0-387-92124-2)

Journal Articles

Linke V, Overmyer KA, Miller IJ, Brademan DR, Hutchins PD, Trujillo EA, Reddy TR, Russell JD, Cushing EM, Schueler DL, Stapleton DS, Rabaglia ME, Keller MP, Gatti DM, Keele GR, Pham D, **Broman KW**, Churchill GA, Attie AD, Coon JJ (2020) A large-scale genome-lipid association map guides lipid identification. *Nat Metab*, 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 **Broman KW** (2020) Reproducibility report: Identifying essential genes by mutagenesis. *ReScience C* 6(1): #12

Rodriguez-Gil JL, Watkins-Chow DE, Baxter LL, Elliot G, Harper UL, Wincovitch SM, Wedel JC, Incao AA, Huebecker 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, Kendziorski 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. *G*3 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 Ś, Churchill GA (2019) Cleaning genotype data from Diversity Outbred mice. *G*3 9:1571–1579

Broman KW, Gatti DM, Simecek P, Furlotte NA, Prins P, Sen Ś, 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, Kendziorski 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
- 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 β-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, Xaiodong 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. *G*3 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. *G*3 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/qtlcharts: 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. *G*3 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: sexspecific 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. *G*3 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 Ś, 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, Kendziorski 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, Lusis AJ (2012) Systems genetics of susceptibility to obesity-induced diabetes in mice. *Physiol Genomics* 44:1–13

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. *G*3 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 *ADAMTSL*2 founder mutation causes Musladin-Lueke Syndrome, a heritable disorder of beagle dogs, featuring stiff skin and joint contractures. *PLoS ONE* 5:e12817

Jurisic 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⁺ 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, Ziegle 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, Naluai-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 Ś, Johannes F, **Broman KW** (2009) Selective genotyping and phenotyping strategies in a complex trait context. *Genetics* 181:1613–1626

Manichaikul A, Moon JY, Sen Ś, 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

Bjornsson HT, Albert TJ, Ladd-Acosta CM, Green RD, Rongione MA, Middle CM, Irizarry RA, **Broman KW**, Feinberg AP (2008) SNP-specific array-based allele-specific expression analysis. *Genome Res* 18:771–779

Peirce JL, **Broman KW**, Lu L, Chesler EJ, Zhou G, Airey DC, Birmingham AE, Williams RW (2008) Genome Reshuffling for Advanced Intercross Permutation (GRAIP): Simulation and permutation for advanced intercross population analysis. *PLoS ONE* 3(4):e1977

Roy-Gagnon M-H, Mathias RA, Fallin MD, Jee SH, **Broman KW**, Wilson AF (2008) An extension of the regression of offspring on mid-parent to test for association and estimate locus-specific heritability: The revised ROMP method. *Ann Hum Genet* 72:115–125

Sinha D, Klise A, Sergeev Y, Hose S, Bhutto IA, Hackler L Jr, Malpic-Ilanos T, Samtani S, Grebe R, Goldberg MF, Hejtmancik JF, Nath A, Zack DJ, Fariss RN, McLeod DS, Sundin O, **Broman KW**, Lutty GA, Zigler JS Jr (2008) β A3/A1-crystallin in astroglial cells regulates retinal vascular remodeling during development. *Mol Cell Neurosci* 37:85–95

2007 Rajagopal SK, Ma Q, Obler D, Shen J, Manichaikul A, Tomita-Mitchell A, Boardman K, Briggs C, Garg V, Srivastava D, Goldmuntz E, Broman KW, Benson DW, Smoot LB, Pu WT (2007) Spectrum of heart disease associated with murine and human GATA4 mutation. J Mol Cell Cardiol 43:677–685

Manichaikul A, Palmer AA, Sen Ś, **Broman KW** (2007) Significance thresholds for quantitative trait locus mapping under selective genotyping. *Genetics* 177:1963–1966

Petkov PM, **Broman KW**, Szatkiewicz JP, Paigen K (2007) Crossover interference underlies sex differences in recombination rates. *Trends Genet* 23:539–542

Peirce JL, **Broman KW**, Lu L, Williams RW (2007) A simple method for combining genetic mapping data from multiple crosses and experimental designs. *PLoS ONE* 2(10):e1036

Teuscher F, **Broman KW** (2007) Haplotype probabilities for multiple-strain recombinant inbred lines. *Genetics* 175:1267–1274

Sen Ś, Satagopan JM, **Broman KW**, Churchill GA (2007) R/qtlDesign: Inbred line cross experimental design. *Mamm Genome* 18:87–93

Lemmerhirt HL, **Broman KW**, Shavit JA, Ginsburg D (2007) Genetic regulation of plasma von Willebrand factor levels: QTL analysis in a mouse model. *J Thromb Haemost* 5:329–335

Nichols KM, **Broman KW**, Sundin K, Young JM, Wheeler PA, Thorgaard GH (2007) Quantitative trait loci by maternal cytoplasmic environment interaction for development rate in *Oncorhynchus mykiss*. *Genetics* 175:335–347

2006 **Broman KW**, Sen Ś, Owens SE, Manichaikul A, Southard-Smith EM, Churchill GA (2006) The X chromosome in quantitative trait locus mapping. *Genetics* 174:2151–2158

Shrestha S, Smith MW, **Broman KW**, Farzadegan H, Vlahov D, Strathdee SA (2006) Multi-person-use of syringes among injection drug users in a needle exchange program: A gene based molecular epidemiological analysis. *J Acquir Immune Defic Syndr* 43:335–343

Kess D, Lindqvist AK, Peters T, Wang H, Zamek J, Nischt R, **Broman KW**, Blakytny R, Krieg T, Holmdahl R, Scharffetter-Kochanek K (2006) Identification of susceptibility loci for skin disease in a murine psoriasis model. *J Immunol* 177:4612–4619

Manichaikul A, Dupuis J, Sen Ś, **Broman KW** (2006) Poor performance of bootstrap confidence intervals for the location of a quantitative trait locus. *Genetics* 174:481–489

Sundin OH, **Broman KW**, Chang HH, Vito ECL, Stark WJ, Gottsch JD (2006) A common locus for lateonset Fuchs corneal dystrophy maps to 18q21.2-q21.32. *Invest Ophthalmol Vis Sci* 47:3919–3926

Feenstra B, Skovgaard IM, **Broman KW** (2006) Mapping quantitative trait loci by an extension of the Haley-Knott regression method using estimating equations. *Genetics* 173:2269–2282

Chadwick LH, Pertz L, **Broman KW**, Bartolomei MS, Willard HF (2006) Genetic control of X chromosome inactivation in mice: definition of the *Xce* candidate interval. *Genetics* 173:2111–2119

Grant GR, Robinson SW, Edwards RE, Clothier B, Davies R, Judah DJ, **Broman KW**, Smith AG (2006) Multiple polymorphic genes determine 'normal' hepatic and splenic iron status in mice. *Hepatology* 44:174–185

Orgogozo V, **Broman KW**, Stern DL (2006) High-resolution QTL mapping reveals sign epistasis controlling ovariole number between two Drosophila species. *Genetics* 173:197–205

Shrestha S, Strathdee SA, **Broman KW**, Smith MW (2006) Unknown biological mixtures evaluation using STR analytical quantification. *Electrophoresis* 27:409–415

Reilly KM, **Broman KW**, Bronson RT, Tsang S, Loisel DA, Christy ES, Sun Z, Diehl J, Munroe DJ, Tuskan RG (2006) An imprinted locus epistatically influences *Nstr1* and *Nstr2* to control resistance to nerve sheath tumors in a neurofibromatosis type 1 mouse model. *Cancer Res* 66:62–68

Sundin OH, Jun AS, **Broman KW**, Liu SH, Sheehan SE, Vito ECL, Stark WJ, Gottsch JD (2006) Linkage of late-onset Fuchs corneal dystrophy to a novel locus at 13pTel-13q12.13. *Invest Ophthalmol Vis Sci* 47:140–145

2005 Sundin OH, Leppert GS, Silva ED, Yang J-M, Dharmaraj S, Maumenee IH, Santos LC, Parsa CF, Traboulsi EI, **Broman KW**, DiBernardo C, Sunness JS, Toy J, Weinberg EM (2005) Extreme hyperopia is the result of null mutations in *MFRP*, which encodes a Frizzled-related protein. *Proc Natl Acad Sci USA* 102:9553–9558

Gottsch JD, Sundin OH, Liu SH, Jun AS, **Broman KW**, Stark WJ, Vito EC, Narang AK, Thompson JM, Magovern M (2005) Inheritance of a novel *COL8A2* mutation defines a distinct early-onset subtype of Fuchs corneal dystrophy. *Invest Ophthalmol Vis Sci* 46:1934–1939

Owens SE, **Broman KW**, Wiltshire T, Elmore JB, Bradley KM, Smith JR, Southard-Smith EM (2005) Genome-wide linkage identifies novel modifier loci of aganglionosis in the *Sox10*^{Dom} model of Hirschsprung disease. *Hum Mol Genet* 14:1549–1558

Broman KW (2005) The genomes of recombinant inbred lines. *Genetics* 169:1133–1146 [Erratum: *Genetics* 173:2419, 2006]

Guler ML, Ligons DL, Wang Y, Bianco M, **Broman KW**, Rose NR (2005) Two autoimmune diabetes loci influencing T cell apoptosis control susceptibility to experimental autoimmune myocarditis. *J Immunol* 174:2167–2173

Congdon N, **Broman KW**, Lai H, Munoz B, Bowie H, Gilbert D, Wojciechowski R, West SK (2005) Cortical, but not posterior subcapsular, cataract shows significant familial aggregation in an older population after adjustment for possible shared environmental factors. *Ophthalmology* 112:73–77

Chen WM, **Broman KW**, Liang KY (2005) Power and robustness of linkage tests for quantitative traits in general pedigrees. *Genet Epidemiol* 28:11–23

2004 Boyadjiev SA, Dodson JL, Radford CL, Ashrafi GH, Beaty TH, Mathews RI, **Broman KW**, Gearhart JP (2004) Clinical and molecular characterization of the bladder exstrophy-epispadias complex: analysis of 232 families. *BJU International* 94:1337–1343

The Complex Trait Consortium [113 authors] (2004) The Collaborative Cross, a community resource for the genetic analysis of complex traits. *Nat Genet* 36:1133–1137

Chen S, Wang W, **Broman KW**, Katki HA, Parmigiani G (2004) BayesMendel: an R environment for Mendelian risk prediction. *Stat Appl Genet Mol Biol* 3(1): article 21

Neff MW, Robertson KR, Wong AK, Safra N, **Broman KW**, Slatkin M, Mealey KL, Pedersen NC (2004) Breed distribution and history of canine *mdr1-1* [€] , a pharmacogenetic mutation that marks the emergence of breeds from the collie lineage. *Proc Natl Acad Sci USA* 101:11725–11730

Tankersley CG, **Broman KW** (2004) Interactions in hypoxic and hypercapnic breathing are genetically linked to mouse chromosomes 1 and 5. *J Appl Physiol* 97:77–84

Congdon N, **Broman KW**, Lai H, Munoz B, Bowie H, Gilbert D, Wojciechowski R, Alston C, West SK (2004) Nuclear cataract shows significant familial aggregation in an older population after adjustment for possible shared environmental factors. *Invest Ophthalmol Vis Sci* 45:2182–2186

Tankersley CG, Campen M, Bierman A, Flanders SE, **Broman KW**, Rabold R (2004) Particle effects on heart-rate regulation in senescent mice. *Inhal Toxicol* 16:381–390

Sivagnanasundaram S, **Broman KW**, Liu M, Petronis A (2004) Quasi-linkage: a confounding factor in linkage analysis of complex disease? *Hum Genet* 114:588–593

Chen WM, **Broman KW**, Liang KY (2004) Quantitative trait linkage analysis by generalized estimating equations: Unification of variance components and Haseman-Elston regression. *Genet Epidemiol* 26:265–272

Kieffer TL, Finucane MM, Nettles RE, Quinn TC, **Broman KW**, Ray SC, Persaud D, Siliciano RF (2004) Genotypic analysis of HIV-1 drug resistance at the limit of detection: Virus production without evolution in treated adults with undetectable HIV loads. *J Infect Dis* 189:1452–1456

2003 Lidman O, Swanberg M, Horvath L, Broman KW, Olsson T, Piehl F (2003) Discrete gene loci regulate neurodegeneration, lymphocyte infiltration and major histocompatibility complex class II expression in the CNS. J Neurosci 23:9817–9823

Glaser RL, **Broman KW**, Schulman RL, Eskenzai B, Wyrobek AJ, Jabs EW (2003) The paternal age effect in Apert syndrome is due in part to the increased frequency of mutations in sperm. *Am J Hum Genet* 73:939–947

Denny P, Hopes E, Gingles N, **Broman KW**, McPheat W, Morten J, Alexander J, Andrew PW, Brown SDM (2003) A major locus conferring susceptibility to infection by *Streptococcus pneumoniae* in mice. *Mamm Genome* 14:448–453

Lamichhane G, Zignol M, Blades NJ, Geiman DE, Dougherty A, **Broman KW**, Bishai WR (2003) A post-genomic method for predicting essential genes at subsaturation levels of mutagenesis: Application to *Mycobacterium tuberculosis*. *Proc Natl Acad Sci USA* 100:7213–7218

Broman KW, Wu H, Sen Ś, Churchill GA (2003) R/qtl: QTL mapping in experimental crosses. *Bioinformatics* 19:889–890

Broman KW (2003) Mapping quantitative trait loci in the case of a spike in the phenotype distribution. *Genetics* 163:1165–1175

Becanovic K, Wallstrom E, Kornek B, Glaser A, **Broman KW**, Dahlman I, Olofsson P, Holmdahl R, Luthman H, Lassmann H, Olsson T (2003) New loci regulating rat myelin oligodendrocyte glycoprotein-induced experimental autoimmune encephalomyelitis. *J Immunol* 170:1062–1069

2002 **Broman KW**, Speed TP (2002) A model selection approach for the identification of quantitative trait loci in experimental crosses. *J Roy Stat Soc* B 64:641–656

Jun AS, **Broman KW**, Do DV, Akpek EK, Stark WJ, Gottsch JD (2002) Endothelial dystrophy, iris hypoplasia, congenital cataract, and stromal thinning (EDICT) syndrome maps to chromosome 15q22.1-q25.3. *Am J Ophthalmol* 134:172–176

Broman KW, Rowe LB, Churchill GA, Paigen K (2002) Crossover interference in the mouse. *Genetics* 160:1123–1131

2001 Hunter KW, Broman KW, Le Voyer T, Lukes L, Cozma D, Debies MT, Rouse J, Welch DR (2001) Predisposition to efficient mammary tumor metastatic progression is linked to the breast cancer metastasis suppressor gene *Brms1*. Cancer Res 61:8866–8872

Ravenel JD, **Broman KW**, Perlman EJ, Niemitz EL, Jayawardena TM, Bell DW, Haber DA, Uejima H, Feinberg AP (2001) Loss of imprinting of Insulin-Like Growth Factor-II (IGF2) and specific biological subtypes of Wilms' tumor. *J Natl Cancer Inst* 93:1698–1703

Broman KW (2001) Review of statistical methods for QTL mapping in experimental crosses. *Lab Animal* 30(7):44–52

Broman KW (2001) Estimation of allele frequencies with data on sibships. *Genet Epidemiol* 20:307–315 [Erratum: *Genet Epidemiol* 23:465–466, 2002]

Giglio S, **Broman KW**, Matsumoto N, Calvari V, Gimelli G, Neumann T, Ohashi H, Voullaire L, Larizza D, Giorda R, Weber JL, Ledbetter DH, Zuffardi O (2001) Olfactory receptor-gene clusters, genomic-inversion polymorphisms, and common chromosome rearrangements. *Am J Hum Genet* 68:874–883

Boyartchuk VL, **Broman KW**, Mosher RE, D'Orazio SEF, Starnbach MN, Dietrich WF (2001) Multigenic control of *Listeria monocytogenes* susceptibility in mice. *Nat Genet* 27:259–260

Yu A, Zhao C, Fan Y, Jang W, Mungall AJ, Deloukas P, Olsen A, Doggett NA, Ghebranious N, **Broman KW**, Weber JL (2001) Comparison of human genetic and sequence-based physical maps. *Nature* 409:951–953

Lichter-Konecki U, **Broman KW**, Blau EB, Konecki DS (2001) Genetic and physical mapping of the locus for autosomal dominant renal Fanconi syndrome, on chromosome 15q15.3. *Am J Hum Genet* 68:264–268

2000 Kissebah AH, Sonnenberg GE, Myklebust J, Goldstein M, Broman K, James RG, Marks JA, Krakower GR, Jacob HJ, Weber J, Martin L, Blangero J, Comuzzie AG (2000) Quantitative trait loci on chromosomes 3 and 17 influence phenotypes of the metabolic syndrome. *Proc Natl Acad Sci USA* 97:14478–14483

Witte JS, Goddard KAB, Conti DV, Elston RC, Lin J, Suarez BK, **Broman KW**, Burmester JK, Weber JL, Catalona WJ (2000) Genomewide scan for prostate cancer-aggressiveness loci. *Am J Hum Genet* 67:92–99

Broman KW, Weber JL (2000) Characterization of human crossover interference. *Am J Hum Genet* 66:1911–1926

Suarez BK, Lin J, Burmester JK, **Broman KW**, Weber JL, Banerfee TK, Goddard KAB, Witte JS, Elston RC, Catalona WJ (2000) A genome screen of multiplex prostate cancer sibships. *Am J Hum Genet* 66:933–944

Brown AS, Feingold E, **Broman KW**, Sherman SL (2000) Genome-wide variation in recombination in female meiosis: A risk factor for non-disjunction of chromosome 21. *Hum Mol Genet* 9:515–523

1999 **Broman KW**, Weber JL (1999) Long homozygous chromosomal segments in reference families from the Centre d'Étude du Polymorphisme Humain. *Am J Hum Genet* 65:1493–1500

Broman KW, Weber JL (1999) Method for constructing confidently ordered linkage maps. *Genet Epidemiol* 16:337–343

Neff MW, **Broman KW**, Mellersh CS, Ray K, Acland GM, Aguirre GD, Ziegle JS, Ostrander EA, Rine J (1999) A second-generation linkage map of the domestic dog, *Canis familiaris*. *Genetics* 151:803–820

1998 **Broman KW**, Murray JC, Sheffield VC, White RL, Weber JL (1998) Comprehensive human genetic maps: Individual and sex-specific variation in recombination. *Am J Hum Genet* 63:861–869

Broman K, Speed T, Tigges M (1998) Estimation of antigen-responsive T cell frequencies in PBMC from human subjects. *Stat Sci* 13:4–8

1996 **Broman K**, Speed T, Tigges M (1996) Estimation of antigen-responsive T cell frequencies in PBMC from human subjects. *J Immunol Meth* 198:119–132

Dernburg AF, **Broman KW**, Fung JC, Marshall WF, Philips J, Agard DA, Sedat JW (1996) Perturbation of nuclear architecture by long-distance chromosome interactions. *Cell* 85:745–759

Editorials

Broman KW (2005) Mapping expression in randomized rodent genomes. Nat Genet 37:209–210

Broman KW, Feingold E (2004) SNPs made routine. Nat Methods 1:104–105

Letters

Sieberts SK, **Broman KW**, Gudbjartsson DF (2004) "Biased towards the null" means reduced power. *Am J Hum Genet* 75:720–722

Broman KW, Caffo BS (2003) Simulation-based P values: Response to North et al. Am J Hum Genet 72:496

Ravenel JD, Perlman EJ, **Broman KW**, Feinberg AP (2002) Response: Re: Loss of imprinting of Insulin-Like Growth Factor-II (IGF2) gene in distinguishing specific biologic subtypes of Wilms tumor. *J Natl Cancer Inst* 94:1809–1810

Broman KW, Weber JL (1998) Estimation of pairwise relationships in the presence of genotyping errors. *Am J Hum Genet* 63:1563–1564

Proceedings and Book Chapters

Broman KW (2012) Applied statistics and exposition (commentary). In: Dudoit S (ed) *Selected Works of Terry Speed*, Springer, pp. 353–355

González-Recio O, López de Maturana E, Vega AT, Engelman CD, **Broman KW** (2009) Detecting single-nucleotide polymorphism by single-nucleotide polymorphism interactions in rheumatoid arthritis by a two-step approach with machine learning and a Bayesian threshold least absolute shrinkage and selection operator (LASSO) model. *BMC Proc* 3(Suppl 7):S63

Broman KW, Heath SC (2007) Managing and manipulating genetic data. In: Barnes MR (ed) *Bioinformatics* for Geneticists, 2nd edition, Wiley, pp. 17–31

Broman KW, Matsumoto N, Giglio S, Martin CL, Roseberry JA, Zuffardi O, Ledbetter DH, Weber JL (2003) Common long human inversion polymorphism on chromosome 8p. In: Goldstein DR (ed) *Science and Statistics: A Festschrift for Terry Speed. IMS Lecture Notes-Monograph Series*, Vol 40, pp. 237–245

Weber JL, **Broman KW** (2001) Human whole genome polymorphism scans: Past, present and future. In: Rao DC, Province MA (eds) *Genetic Dissection of Complex Traits*. Vol. 42: *Advances in Genetics*. Academic Press, New York, pp. 77–96

Broman KW (1999) Cleaning genotype data. In: Goldin L, Amos CI, Chase GA, Goldstein AM, Jarvik GP, Martinez MM, Suarez BK, Weeks DE, Wijsman EM, MacCluer JE. Genetics Workshop 11: Analysis of genetic and environmental factors in common diseases. *Genet Epidemiol* 17(Suppl. 1):S79–S83

Broman KW, Speed TP (1999) A review of methods for identifying QTLs in experimental crosses. In: Seillier-Moiseiwitsch F (ed) *Statistics in Molecular Biology and Genetics. IMS Lecture Notes–Monograph Series*, Vol. 33, pp. 114–142

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

Broman KW (2010) Genetic map construction with R/qtl. Technical report #214, Department of Biostatistics and Medical Informatics, University of Wisconsin–Madison

Broman KW (2006) Use of hidden Markov models for QTL mapping. Working paper 125, Department of Biostatistics, Johns Hopkins University, Baltimore, MD

Blades NJ, **Broman KW** (2002) Estimating the number of essential genes in a genome by random transposon mutagenesis. Technical Report MS02-20, Department of Biostatistics, Johns Hopkins University, Baltimore, MD

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 (rqtl.org).
R/qtl2	A reimplementation of the R package R/qtl, to better handle high-dimensional data and complex cross designs. (kbroman.org/qtl2).
R/qtlcharts	An R package to create interactive data visualizations for quantitative trait locus mapping data (kbroman.org/qtlcharts).
aRxiv	An R package for searching arXiv, a repository of electronic preprints for computer science, mathematics, physics, quantitative biology, quantitative finance, and statistics. (github.com/ropensci/aRxiv).
git/GitHub guide	Online tutorial on the git version control system and its use with

GitHub.com(kbroman.org/github tutorial).

knitr in a knutshell Online tutorial on knitr, a tool for creating documents that mix code

and text (kbroman.org/knitr_knutshell).

minimal make Online tutorial on GNU Make, for automating computational tasks

(kbroman.org/minimal make).

R package primer Online tutorial on writing packages for the R statistical software

(kbroman.org/pkg primer).

simple site Online tutorial on constructing simple websites with GitHub Pages

(kbroman.org/simple_site).

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 2001 – 2002 1999 – 2002	Sadeep Shresthra Rasika Mathias Cynthia James	Epidemiology Epidemiology Human Genetics (School of Medicine)
Oral Ex	ams, University	of Wisconsin-Madison	
	2019 2018	Michael Kartje Christopher McAllester Thevaa Chandereng	Genetics Genetics Statistics
	2017	Constanza Rojo Quentin Sprengelmeyer Jeremy Lange Kyubin Lee Fred Boehm	Statistics Genetics Genetics Computer Sciences Statistics
	2016	April Peterson Alessandra York	Genetics Genetics
	2015	René Welch	Statistics
	2014	Shuyun Ye Michelle Parmenter Jeea Choi	Statistics Genetics Statistics
	2013	Jianan Tian Richard Wang Shuang Huang Raja Farhana Raja Mohd Anuar Molly McDevitt	Statistics Genetics Statistics Plant Breeding and Plant Genetics Biochemistry

2012 Katie Clowers Genetics

2011 Il Youp Kwak Statistics

2010 Jee Young Moon Statistics
John Dawson Statistics
Elias Chaibub Neto Statistics
Qinglin Pei Statistics
Jingfang Zhang Oncology

2008 Beth Dumont Genetics

Oral Exams, Johns Hopkins University

2006 Lindsey Garver Molecular Microbiology and Immunology
Benilton Carvalho Biostatistics
Yen-Yi Ho Biostatistics
Lindsey Enewold Epidemiology

Renee Gardner Environmental Health Sciences

2005 Ani Manichaikul Biostatistics Wenyi Wang Biostatistics

Meera Venkatesan Molecular Microbiology and Immunology

	Audrey Grant	Epidemiology
2004	Katherine Swanson	Molecular Microbiology and Immunology
2003	Sadeep Shrestha Wei-Min Chen	Epidemiology Biostatistics
2002 2001	Marie-Hélène Roy-Gagnon Leslie Cope Vivian Yuan Jean-Paul Chretien	Epidemiology Mathematical Sciences (School of Engineering) Mathematical Sciences (School of Engineering) Epidemiology
2000	Xin Liu Tsuo-Hung Lan Halcyon Skinner	Epidemiology Epidemiology Epidemiology
1999	David Kaufman	Epidemiology

Doctoral Thesis Defenses, University of Wisconsin-Madison

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

Doctoral Thesis Defenses, Johns Hopkins University

2007 Ani Manichaikul Biostatistics

2005	Katherine Swanson Laura LaRosa Ji Wan Park Martina Johannesson	Molecular Microbiology and Immunology Environmental Health Sciences Epidemiology Lund University, Sweden
2004	Wei-Min Chen Marie-Hélène Roy-Gagnon	Biostatistics Epidemiology
2001	Alison Klein Tsuo-Hung Lan	Epidemiology 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 Heping Hu, MHS Rita Peila, ScM	Epidemiology Epidemiology Epidemiology

Classroom Instruction, University of Wisconsin-Madison

Spring, 2020	BMI 882 BMI 826-001	Biomedical Data Science Scholarly Literature 2 (<i>new</i>) Advanced Data Analysis (<i>new</i>)
Fall, 2019	BMI 881	Biomedical Data Science Scholarly Literature 1 (new)
Spring, 2019	Statistics 877	Statistical Methods in Molecular Biology (jointly with Drs. Kendziorski, Lu, Dewey, Newton, Keles, Roy, Ané, and Tang)
Spring, 2018	Agronomy 957	Plant Breeding and Plant Genetics seminar (jointly with Brian Yandell)
Spring, 2017	Statistics 877	Statistical Methods in Molecular Biology (jointly with Drs. Kendziorski, Larget, Ané, Newton, 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 Statistics 877	Tools for Reproducible Research (<i>new</i>) Statistical Methods in Molecular Biology (jointly with Drs. Newton, Kendziorski, Larget, Ané, Yandell, Wang, and Keles)
Fall, 2012	BMI 826-001	Statistical Methods for QTL Mapping

Spring, 20	12 Statistics 877	Statistical Methods in Molecular Biology (jointly with Drs. Newton, Kendziorski, Larget, Ané, Yandell, Wang, and Keles)
Spring, 20	11 Statistics 992-001	Statistical Methods for QTL Mapping (new)
Summer, 2	2010 Population Health 904-003	Analytic Methods in Genetic Epidemiology (jointly with Drs. Engelman, Payseur, and Meyers)
Spring, 20	10 Statistics 877	Statistical Methods in Molecular Biology (jointly with Drs. Newton, Kendziorski, Larget, Ané, Yandell, Wang, and Keles)
Fall, 2008	Statistics 371-003	Introductory Applied Statistics for the Life Sciences
Summer, 2	2008 Population Health 904-003	Analytic Methods in Genetic Epidemiology (jointly with Drs. Engelman, Payseur, and Skinner)
Spring, 20	08 Statistics 992-002	Statistical Methods in Molecular Biology (<i>new</i>) (jointly with Drs. Newton, Kendziorski, Larget, Ané, Yandell, and Keles)
Classroom Instruc	tion, Johns Hopkins University	
2006 – 200	7 Biostatistics 140.668	Special Topics in Genetics and Genomics
2005 – 200	Biostatistics 140.615–616 Epidemiology 340.631	Statistics for Laboratory Scientists Methods in Genetic Epidemiology I (jointly with Dr. Beaty)
2004 – 200	5 Biostatistics 140.776	Statistical Computing (jointly with Drs. Caffo, Irizarry, and Ruczinski)
	Biostatistics 140.668	Special Topics in Genetics and Genomics (jointly with Dr. Ruczinksi)
	Biostatistics 140.615–616 Epidemiology 340.631	Statistics for Laboratory Scientists Methods in Genetic Epidemiology I
	Epidemiology 940.001	(jointly with Dr. Beaty)
2003 – 200	4 Biostatistics 140.776	Statistical Computing (<i>new</i>) (jointly with Drs. Caffo, Irizarry, and Ruczinski)
	Biostatistics 140.615–616	Statistics for Laboratory Scientists
2002 – 200	Biostatistics 140.668	Special Topics in Genetics and Genomics (<i>new</i>) (jointly with Dr. Parmigiani)
	Biostatistics 140.615–616	Statistics for Laboratory Scientists
2001 – 200	2 Biostatistics 140.615	Statistics for Laboratory Scientists (new)
2000 – 200		Advanced Statistical Computing (new)
	Biostatistics 140.667 Biostatistics 140.668	Genetics for Statisticians Statistical Genetics
1999 – 200		Genetics for Statisticians (new)
	Biostatistics 140.668	Statistical Genetics (new)

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	* *	oducible research" and "Exploratory data analysis" in rmatics), Department of Biostatistics & Medical onsin-Madison
2019		ducible research" to MD/PhD students, School of niversity of Wisconsin–Madison
2018 – 2019		' to KL2 scholars, Institute for Clinical and Translational and Public Health, University of Wisconsin–Madison
2016 – 2018	Instructor, Data Carpentry wor Wisconsin–Madison	kshops, Advanced Computing Initiative, University of
2017 – 2018	Workshop on Reproducible Res Washington	search, Summer Institute in Statistics for Big Data, Seattle,
2013 – 2018		igures and tables" to MD/PhD students, School of niversity of Wisconsin–Madison
2018	Instructor, Workshop on Advar	nced R and R/qtl, ICRISAT, Hyderabad, India
2018		ducible research" for the Cellular and Molecular University of Wisconsin–Madison
2017	Instructor, Data Carpentry wor. Development Conference, Chic	kshop, National Society of Black Engineers Professional ago, Illinois
2017	Workshop on Systems Genetics	of Neurodegeneration, Frauenchiemsee, Germany
2017	Workshop on R/qtl and R/qtl2 Tennessee	software, Complex Trait Community meeting, Memphis,
2017		producible research" as part of a Data Science and Plant , University of Minnesota, St. Paul, Minnesota
2017	Lecture to AP Statistics student	s, Madison East High School, Madison, Wisconsin
2008 – 2017		effective figures and tables" in the Department of icine, University of Wisconsin–Madison
2008 – 2017	Lecture on my consulting exper Statistics, University of Wiscons	riences in Statistical Consulting (Stat 998), Department of sin–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, ICRISAT, 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 th 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 12th 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	
2010 – 2020	and Medical Informatics, University of Wisconsin–Madison 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

NIH/NIGMS

co-PI with Gary Churchill (Jackson Laboratory)

07/01/15 - 07/31/23 (25%)

Develop statistical methods and software for the analysis of multi-parent crosses, such as the mouse Diversity Outcross population and the Collaborative Cross.

Role: Co-Principal investigator

NIAID Centers of Excellence for Influenza Research and Surveillance

NIH/NIAID

Yoshihiro Kawaoka, PI

04/01/14 - 08/31/20

(8%)

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.

Role: Co-investigator

A Program of Research in Population Cytogenetics

NIH/NICHD

Terry Hassold (Washington State), PI

12/01/10 - 07/31/20

(8%)

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.

Role: Co-investigator

Collaborative Cross of the Microbiome and Metabolic Disease

NIH/NIDDK

Federico Rey, PI

09/23/15 - 08/31/20

(5%)

Identify genes and pathways that modulate gut microbial composition and abundance, and their association to disease, in the mouse Diversity Outcross.

Role: Co-investigator

Genetics of the Island Rule

NIH/NIGMS

Bret Payseur, PI

09/10/12 - 02/28/21

(5%)

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.

Role: Co-investigator

Evolution of the Genome-wide Recombination Rate in Mice

NIH/NIGMS

Bret Payseur, PI

05/15/17 - 03/31/21

(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

NIH/NIGMS

Robert W. Williams and Saunak Sen, PIs

04/15/17 - 03/31/21

(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

NIH/NIHD

Albee Messing, PI

09/20/14 - 07/31/19

(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

NIH/NIDDK

Alan Attie, PI

04/01/14 - 01/31/19

(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

NIH/NIGMS

Gary Churchill (Jackson Laboratory), PI

04/01/06 - 06/30/16

(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

NIH/NIGMS

Christina Kendziorski, PI

08/01/12 - 04/30/16

(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

NIH/NIDA

Abraham Palmer (U Chicago), PI

07/01/11 - 12/31/15

(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

NIH/NIGMS

Karl Broman, PI

06/01/05 - 05/31/15

(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

NIH/NIDDK

Alan Attie (UW-Madison), PI

12/01/09 - 11/30/14

(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

NIH/NIDDK

Michelle Southard-Smith (Vanderbilt University), PI

07/01/07 - 06/30/12

(8%)

The goal of the proposed studies is to identify additional genes and gene interactions that impact aganglionosis in the $Sox10^{Dom}$ model.

Role: Co-Investigator

Statistical Methods for Experimental Genome Populations

NIH/NIGMS

Saunak Sen (UCSF), PI

07/01/07 - 06/30/12

(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

NIH/NIAID

Jason Rasgon (Johns Hopkins University), PI

07/01/07 - 10/31/11

(2%)

Identify genetic loci contributing to variation in West Nile virus vector competence in susceptible and refractory colonis of Culex tarsalis.

Role: Co-Investigator

Genetic Basis of Nanophthalmos and Axial Hyperopia

NIH/NEI

Olof Sundin (Texas Tech), PI

09/01/09 - 08/31/11

(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

NIH/NHLBI

Wayne Mitzner (Johns Hopkins University), PI

12/01/04 - 6/30/07

(3%)

Identify genetic loci contributing to variation in inflammation-induced airway hyperactivity in mice.

Role: Co-Investigator

Center for Epigenetics of Common Human Diseases

NIH/NHGRI

Andrew Feinberg, PI

04/01/04 - 06/30/07

(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

NIH/NIMH

James Potash, PI

04/01/05 - 06/30/07

(10%)

Establish the connection between genetic, environmental, and epigenetic factors and susceptibility to depression.

Role: Co-Investigator

Genetic Mechanisms of Autoimmune Myocarditis

NIH/NHLBI

Noel Rose, PI

07/01/04 - 06/30/07

(4%)

Identify genetic loci contributing to susceptibility to autoimmune myocarditis in mice.

Role: Co-Investigator

Catecol-O-methyltransferase and Breast Cancer

NIH/NCI

James Yager, PI

09/21/04 - 06/30/07

(2.5%)

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.

Role: Co-Investigator

Core Center Grant: Biostatistical Center

NIH/NEI

Sheila West, PI

07/01/04 - 06/30/07

(5%)

Provide biostatistics support for epidemiological research in ophthalmology.

Role: Senior Biostatistician

Older Americans Independence Center

NIH/NIA

Linda Fried, PI

06/01/03 - 06/30/07

(1.5%)

The Center is dedicated to developing the next generation of research to determine the causes and treatments for frailty in older adults.

Role: Advisory Board Member

Statistical Methods for Genetic Epidemiology

NIH/NIGMS

Kung-Yee Liang, PI; Karl Broman, acting PI

12/01/00 - 11/30/05

(25%)

Develop and implement new statistical methodology useful for genetic epidemiologic studies of complex chronic diseases.

Role: Co-Investigator

Portable Software for Mapping Quantitative Traits

NIH/NHGRI

Ken Manly, PI

09/24/04 - 08/31/05

(5%)

Design and test a graphical user interface for software R/qtl and ensure that the GUI makes the proper connections with the core program.

Role: Co-Investigator

Center for Craniofacial Development and Disorders

NIH/NIDR

Terri Beaty, PI

08/01/01 - 08/01/04

(5%)

Biostatistical Core for program project on the genetics of craniofacial disorders.

Role: Co-Investigator

Mouse QTL in Endotoxic Shock

NIH

Roger Reeves, PI

08/01/01 - 07/30/05

(10%)

Identify genomic regions contributing to susceptibility to endotoxic shock in mice.

Role: Co-Investigator

Genetic Basis of Nanophthalmos

NIH/NEI

Olof Sundin, PI

08/15/01 - 06/30/04

(10%)

Identify the gene responsible for nanophthalmos in a single large pedigree.

Role: Co-Investigator

Center for Craniofacial Development and Disorders

NIH/NIDR

Ethylin Jabs, PI

08/01/99 - 04/30/04

(10%)

Map and identify genes contributing to susceptibility to craniofacial disorders by linkage in multiplex families.

Role: Co-Investigator

The Genetics of Age Related Cataract in Salisbury

NIH/NIA

Nathan Congdon, PI

09/30/00 - 08/31/03

(10%)

Identify genes contributing to susceptibility to cataract

Role: Co-Investigator

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

2007

2005

Scientif	ic 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

Systems Medicine Workshop, NHLBI, Bethesda, Maryland

Joint Statistical Meetings, Minneapolis, Minnesota

CSPS/IMS Joint Meeting, Beijing, China

Fifth Australiasian Human Gene Mapping Conference, Mt. Buller, Australia

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 1996	Classification Society of North America meeting, St. Louis, Missouri Modifier Analysis in Cancer Genetics of Experimental Mammals Workshop, Madison, Wisconsin WNAR/IMS Western Regional Conference, Pullman, Washington
Semina	ars
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 Biometric Research Branch, National Cancer Institute, Bethesda, Maryland 2000 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, Reykjávik, Iceland Biostatistics Department, University of Michigan, Ann Arbor Department of Statistics, University of California, Berkeley Department of Mathematical Sciences, University of Wisconsin-Milwaukee

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

1997