

## 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 – 2021      Senior Editor, *Genetics*

2016 – 2021      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; G3 (Bethesda); 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; Lab Animal; 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; New Phytologist; Nucleic Acids Research; Ophthalmic Epidemiology; Pacific Symposium on Biocomputing; Physical Review Letters; Physiological Genomics; Plant Cell; Plant Physiology; PLoS Biology; PLoS Computational Biology; PLoS Genetics; PLoS ONE; Proceedings of the National Academy of Sciences USA; Proceedings of the Royal Society B: Biological Sciences; 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); NWO Talent Programme (Netherlands); 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

- 2023 Zhang Q, Linke V, Overmyer KA, Traeger LL, Kasahara K, Miller IJ, Manson DE, Polaske TJ, Kerby RL, Kemis JH, Trujillo EA, Reddy TR, Russell JD, Schueler KL, Stapleton DS, Rabaglia ME, Seldin M, Gatti DM, Keele GR, Pham DT, Gerdt JP, Vivas EI, Lusi AJ, Keller MP, Churchill GA, Blackwell HE, **Broman KW**, Attie AD, Coon JJ, Rey FE (2023) Genetic mapping of microbial and host traits reveals production of immunomodulatory lipids by *Akkermansia muciniphila* in the murine gut. *Nat Microbiol* 8:424–440 doi:10/jz3m
- 2022 Yoshihara T, Miller ND, Rabanal FA, Myles H, Kwak I-Y, **Broman KW**, Sadkhin B, Baxter I, Dilkes BP, Hudson ME, Spalding EP (2022) Leveraging orthology within maize and Arabidopsis QTL to identify genes affecting natural variation in gravitropism. *Proc Natl Acad Sci USA* 119: e2212199119 doi:10.1073/pnas.2212199119
- Vincent M, Gyuricza IG, Keele GR, Gatti DM, Keller MP, **Broman KW**, Churchill GA (2022) QTLViewer: An interactive webtool for genetic analysis in the Collaborative Cross and Diversity Outbred mouse populations. *G3 (Bethesda)* 12:jkac146 doi:10.1093/g3journal/jkac146
- Michel KJ, Lima DC, Hudley H, Singan V, Yoshinaga Y, Daum C, Barry K, **Broman KW**, Buell CR, de Leon N, Kaeppler SM (2022) Genetic mapping and prediction of flowering time and plant height in a maize Stiff Stalk MAGIC population. *Genetics* 221:iyac063 doi:10.1093/genetics/iyac063
- Broman KW** (2022) A generic hidden Markov model for multi-parent populations. *G3 (Bethesda)* 12:jkab396 doi:10.1093/g3journal/jkab396
- 2021 Trotter C, Kim H, Farage G, Prins P, Williams RW, **Broman KW**, Sen Ś (2021) Speeding up eQTL scans in the BXD population using GPUs. *G3 (Bethesda)* 11:jkab254 doi:10.1093/g3journal/jkab254
- Lobo AK, Traeger LL, Keller MP, Attie AD, Rey FE, **Broman KW** (2021) Identification of sample mix-ups and mixtures in microbiome data in Diversity Outbred mice. *G3 (Bethesda)* 11:jkab308 doi:10.1093/g3journal/jkab308
- Tran Q, **Broman KW** (2021) Treatment of the X chromosome in mapping multiple quantitative trait loci. *G3 (Bethesda)* 11:jkab005 doi:10.1093/g3journal/jkab005
- Hassold T, Maylor-Hagen H, Wood A, Gruhn J, Hoffmann E, **Broman KW**, Hunt P (2021) Failure to recombine is a common feature of human oogenesis. *Am J Hum Genet* 108:16–24 doi:10/gm56
- 2020 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* 2:1149–1162 doi:10/gk5cn6
- 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* 73:771–782 doi:10/gjpnzk
- Broman KW** (2020) Reproducibility report: Identifying essential genes by mutagenesis. *ReScience C* 6(1): #12 doi:10.5281/zenodo.3959516

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 doi:10.1242/dmm.042614

- 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 doi:10.1172/JCI129143

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 doi:10.1371/journal.pgen.1008073

Boehm FJ, Chesler EJ, Yandell BS, **Broman KW** (2019) Testing pleiotropy vs. separate QTL in multiparental populations. *G3 (Bethesda)* 9:2317–2324 doi:10.1534/g3.119.400098

Boehm F, Yandell B, **Broman KW** (2019) qtl2pleio: Testing pleiotropy vs. separate QTL in multiparental populations. *J Open Source Software* 4(38):1435 doi:10.21105/joss.01435

**Broman KW**, Gatti DM, Svenson KL, Sen Ś, Churchill GA (2019) Cleaning genotype data from Diversity Outbred mice. *G3 (Bethesda)* 9:1571–1579 doi:10.1534/g3.119.400165

**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 doi:10.1534/genetics.118.301595

- 2018 Palus M, Sohrabi Y, **Broman KW**, Strnad H, Šíma M, Růžek D, Volkova V, Slapnicková 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 doi:10/gm57

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 doi:10.1534/genetics.118.300864

**Broman KW**, Woo KH (2018) Data organization in spreadsheets. *Am Stat* 72:2–10 doi:10/gdz6cm

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 doi:10.1002/oby.22075

- 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 doi:10.1371/journal.pone.0181738

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 doi:10.1111/mec.13932

- 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, Kendzierski 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 doi:10.1371/journal.pgen.1006466
- 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 doi:10.1534/genetics.116.193805
- 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 doi:10.1371/journal.pone.0160447
- 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 doi:10.21105/joss.00025
- 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 doi:10/gdsf9t
- Tian J, Keller MP, Broman AT, Kendzierski C, Yandell BS, Attie AD, **Broman KW** (2016) The dissection of expression quantitative trait locus hotspots. *Genetics* 202:1563–1574 doi:10.1534/genetics.115.183624
- 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 doi:10.1016/j.ajhg.2015.11.019
- 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 (Bethesda)* 6:79–86 doi:10.1534/g3.115.024133
- 2015 Tian J, Keller MP, Oler AT, Rabaglia ME, Schueler KL, Stapleton DS, Broman AT, Zhao W, Kendzierski 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 doi:10.1534/genetics.115.179432
- Broman KW**, Keller MP, Broman AT, Kendzierski C, Yandell BS, Sen Ś, Attie AD (2015) Identification and correction of sample mix-ups in expression genetic data: A case study. *G3 (Bethesda)* 5:2177–2186 doi:10.1534/g3.115.019778
- 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 doi:10.1534/genetics.115.177790
- 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 doi:10.1111/mec.13044
- Broman KW** (2015) R/qtcharts: Interactive graphics for quantitative trait locus mapping. *Genetics* 199:359–361 doi:10.1534/genetics.114.172742

- 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 doi:10.1128/JVI.01219-14
- 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 (Bethesda)* 4:1623–1633 doi:10.1534/g3.114.013748
- 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 doi:10/f6hwgk
- 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 doi:10.1534/genetics.114.166306
- Broman KW** (2014) Fourteen years of R/qtl: Just barely sustainable. *J Open Res Softw* 2(1):e11 doi:10.5334/jors.at
- 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 doi:10.1016/j.ajhg.2014.06.008
- 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 doi:10.1534/genetics.113.158014
- 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 doi:10.1371/journal.pgen.1004125
- 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 doi:10.1371/journal.pone.0085075
- 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 doi:10.1534/genetics.113.153346
- 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 (Bethesda)* 3:1819–1825 doi:10.1534/g3.113.007567
- 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 doi:10.1128/JVI.00909-13
- 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 doi:10.1002/ajmg.b.32176

- 2012 **Broman KW**, Kim S, Sen S, Ané C, Payseur BA (2012) Mapping quantitative trait loci onto a phylogenetic tree. *Genetics* 192:167–179 doi:10.1534/genetics.112.142448
- 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 doi:10/gm58
- 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 (Bethesda)* 2:1041–1046 doi:10.1534/g3.112.003525
- 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 doi:10.1371/journal.pone.0043690
- 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 doi:10.1534/genetics.112.139451
- 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 doi:10.1101/gr.134031.111
- 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 doi:10.1194/jlr.M025239
- 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 doi:10.1093/bioinformatics/bts049
- 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 doi:10/fwbzj7
- Broman KW** (2012) Genotype probabilities at intermediate generations in the construction of recombinant inbred lines. *Genetics* 190:403–412 doi:10.1534/genetics.111.132647
- Broman KW** (2012) Haplotype probabilities in advanced intercross populations. *G3 (Bethesda)* 2:199–202 doi:10.1534/g3.111.001818
- Collaborative Cross Consortium [97 authors] (2012) The genome architecture of the Collaborative Cross mouse genetic reference population. *Genetics* 190:389–401 doi:10.1534/genetics.111.132639
- 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 doi:10.1093/neuonc/nor206
- 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 doi:10/djfhjh



- 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 doi:10.1371/journal.ppat.1002381
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- 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 doi:10/bg6j8r
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Weber JL, **Broman KW** (2001) Genotyping for human whole-genome 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 doi:10/c24nxx

**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 doi:10.1002/gepi.1370170714

**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 doi:10/cxnmgv

#### Technical Reports and Preprints

**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 ( <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/qtl2convert	An R package for converting QTL data ( <a href="http://cran.r-project.org/package=qtl2convert">cran.r-project.org/package=qtl2convert</a> ).
R/qtl2fst	An R package for storing genotype probabilities ( <a href="http://cran.r-project.org/package=qtl2fst">cran.r-project.org/package=qtl2fst</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> ).
d3panels	A CoffeeScript library of interactive graphics panels ( <a href="http://kbroman.org/d3panels">kbroman.org/d3panels</a> ).
R/simcross	An R package for simulating general experimental crosses ( <a href="http://kbroman.org/simcross">kbroman.org/simcross</a> ).
R/lineup	An R packages for identifying sample mixups in QTL data ( <a href="http://cran.r-project.org/package=lineup">cran.r-project.org/package=lineup</a> ).
R/lineup2	An R packages for identifying sample mixups in QTL data, rewritten to not be tied to the R/qtl package ( <a href="http://cran.r-project.org/package=lineup2">cran.r-project.org/package=lineup2</a> ).
R/negenes	An R package for estimating the number of essential genes by random transposon mutagenesis ( <a href="http://cran.r-project.org/package=negenes">cran.r-project.org/package=negenes</a> ).
R/xoi	An R package for the analysis of crossover interference ( <a href="http://cran.r-project.org/package=xoi">cran.r-project.org/package=xoi</a> ).
R/broman	An R package with miscellaneous tools for graphics, statistics, and data analysis ( <a href="http://cran.r-project.org/package=broman">cran.r-project.org/package=broman</a> ).
R/mbmixture	An R package for assessing mixtures in microbiome samples ( <a href="http://cran.r-project.org/package=mbmixture">cran.r-project.org/package=mbmixture</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> ).
R/mmconvert	An R package for converting mouse genome positions between physical and genetic maps. ( <a href="http://cran.r-project.org/package=mmconvert">cran.r-project.org/package=mmconvert</a> ).

git/GitHub guide	Online tutorial on the git version control system and its use with GitHub ( <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

2022	Francesca Nimityongskul	MS candidate, Biomedical Data Science
2021 – 2022	Tim Gruenloh	MS candidate, Biomedical Data Science
2021 – 2022	Huan Liang	MS candidate, Biomedical Data Science
2018 – 2020	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	MHS candidate, Bioinformatics
2005 – 2006	Jichao Chen	MHS candidate, 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

2022 – present	Ashley Henry	Botany
2018 – present	Qijun Zhang	Cellular and Molecular Pathology
2017 – present	Christopher McAllester	Genetics
2022 – 2023	Jie Song	Statistics
2021 – 2022	Zihao Zheng	Statistics
2021 – 2022	Chenyang Dong	Statistics
2021 – 2022	Joseph Lalli	Genetics
2000 – 2021	Nathan Wally Anderson	Integrative Biology
2019 – 2021	Athena Golfinos	Cellular and Molecular Pathology
2018 – 2021	Michael Kartje	Genetics
2017 – 2021	Jeremy Lange	Genetics
2016 – 2021	April Peterson	Genetics
2015 – 2021	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
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#### 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

2021	Zihao Zheng	Statistics
	Quoc Tran	Statistics
	Chenyang Dong	Statistics
2020	Qijun Zhang	Cellular and Molecular Pathology
	Athena Golfinos	Cellular and Molecular Pathology
2019	Michael Kartje	Genetics
2018	Christopher McAllester	Genetics
	Thevaa Chandereng	Statistics
2017	Constanza Rojo	Statistics
	Quentin Sprengelmeyer	Genetics
	Jeremy Lange	Genetics
	Kyubin Lee	Computer Sciences
	Fred Boehm	Statistics
2016	April Peterson	Genetics
	Alessandra York	Genetics
2015	René Welch	Statistics
2014	Shuyun Ye	Statistics
	Michelle Parmenter	Genetics
	Jeea Choi	Statistics
2013	Jianan Tian	Statistics
	Richard Wang	Genetics
	Shuang Huang	Statistics
	Raja Farhana Raja Mohd Anuar	Plant Breeding and Plant Genetics
	Molly McDevitt	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	Epidemiology
	Wei-Min Chen	Biostatistics
2002	Marie-Hélène Roy-Gagnon	Epidemiology
2001	Leslie Cope	Mathematical Sciences (School of Engineering)
	Vivian Yuan	Mathematical Sciences (School of Engineering)
	Jean-Paul Chretien	Epidemiology
2000	Xin Liu	Epidemiology
	Tsuo-Hung Lan	Epidemiology
	Halcyon Skinner	Epidemiology
1999	David Kaufman	Epidemiology

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

2022	Zihao Zheng	Statistics
	Chenyang Dong	Statistics
	Jie Song	Statistics
2021	Jeremy Lange	Genetics
	Quentin Sprengelmeyer	Genetics
	April Peterson	Genetics
2020	Thevaa Chandereng	Statistics
2019	Constanza Rojo	Statistics
	Fred Boehm	Statistics

	Molly McDevitt	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

#### 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
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#### 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

2022 – 2023	BMI 881 BMI 882 BMI 883 BMI 884	Biomedical Data Science Scholarly Literature 1 Biomedical Data Science Scholarly Literature 2 Biomedical Data Science Professional Skills 1 Biomedical Data Science Professional Skills 2
2021 – 2022	BMI 881 BMI 882 BMI 883 BMI 884	Biomedical Data Science Scholarly Literature 1 Biomedical Data Science Scholarly Literature 2 Biomedical Data Science Professional Skills 1 Biomedical Data Science Professional Skills 2
2020 – 2021	BMI 881 BMI 882 BMI 883 BMI 884	Biomedical Data Science Scholarly Literature 1 Biomedical Data Science Scholarly Literature 2 Biomedical Data Science Professional Skills 1 ( <i>new</i> ) Biomedical Data Science Professional Skills 2 ( <i>new</i> )
2019 – 2020	BMI 881 BMI 882 BMI 826-001	Biomedical Data Science Scholarly Literature 1 ( <i>new</i> ) Biomedical Data Science Scholarly Literature 2 ( <i>new</i> ) Advanced Data Analysis ( <i>new</i> )
2018 – 2019	Statistics 877	Statistical Methods in Molecular Biology ( <i>jointly</i> )
2017 – 2018	Agronomy 957	Plant Breeding and Plant Genetics seminar ( <i>jointly</i> )
2016 – 2017	Statistics 877	Statistical Methods in Molecular Biology ( <i>jointly</i> )
2015 – 2016	BMI 826-003	Tools for Reproducible Research
2014 – 2015	BMI 826-003	Tools for Reproducible Research
2013 – 2014	BMI 826-003 Statistics 877	Tools for Reproducible Research ( <i>new</i> ) Statistical Methods in Molecular Biology ( <i>jointly</i> )
2012 – 2013	BMI 826-001	Statistical Methods for QTL Mapping
2011 – 2012	Statistics 877	Statistical Methods in Molecular Biology ( <i>jointly</i> )
2010 – 2011	Statistics 992-001	Statistical Methods for QTL Mapping ( <i>new</i> )
2009 – 2010	Statistics 877 Population Health 904-003	Statistical Methods in Molecular Biology ( <i>jointly</i> ) Analytic Methods in Genetic Epidemiology ( <i>jointly</i> )
2008 – 2009	Statistics 371-003	Introductory Applied Statistics for the Life Sciences
2007 – 2008	Statistics 992-002 Population Health 904-003	Statistical Methods in Molecular Biology ( <i>new, jointly</i> ) Analytic Methods in Genetic Epidemiology ( <i>jointly</i> )

## Classroom Instruction, Johns Hopkins University

2006 – 2007	Biostatistics 140.668	Special Topics in Genetics and Genomics
2005 – 2006	Biostatistics 140.615–616	Statistics for Laboratory Scientists

	Epidemiology 340.631	Methods in Genetic Epidemiology I ( <i>jointly</i> )
2004 – 2005	Biostatistics 140.776 Biostatistics 140.668 Biostatistics 140.615–616 Epidemiology 340.631	Statistical Computing ( <i>jointly</i> ) Special Topics in Genetics and Genomics ( <i>jointly</i> ) Statistics for Laboratory Scientists Methods in Genetic Epidemiology I ( <i>jointly</i> )
2003 – 2004	Biostatistics 140.776 Biostatistics 140.615–616	Statistical Computing ( <i>new, jointly</i> ) Statistics for Laboratory Scientists
2002 – 2003	Biostatistics 140.668 Biostatistics 140.615–616	Special Topics in Genetics and Genomics ( <i>new, jointly</i> ) Statistics for Laboratory Scientists
2001 – 2002	Biostatistics 140.615	Statistics for Laboratory Scientists ( <i>new</i> )
2000 – 2001	Biostatistics 140.778 Biostatistics 140.667 Biostatistics 140.668	Advanced Statistical Computing ( <i>new</i> ) Genetics for Statisticians Statistical Genetics
1999 – 2000	Biostatistics 140.846 Biostatistics 140.668	Genetics for Statisticians ( <i>new</i> ) Statistical Genetics ( <i>new</i> )

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

Summer, 1994	Statistics 131A	Introductory Statistics for Social and Life Scientists
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#### Classroom Instruction, University of Wisconsin–Milwaukee

1991 – 1992	Mathematics 095	Basic Algebra
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#### Other teaching

2018 – 2022	Lecture on “Data management” to KL2 scholars, Institute for Clinical and Translational Research, School of Medicine and Public Health, University of Wisconsin–Madison	
2022	Lecture on “QTL mapping in multi-parent populations” in BMI 877 (Statistical Methods for Molecular Biology), Department of Biostatistics & Medical Informatics, University of Wisconsin–Madison	
2021 – 2022	Lecture on “Steps toward reproducible research” for the Summer Research Program in Biomedical Data Science, Department of Biostatistics & Medical Informatics, University of Wisconsin–Madison	
2021	Lectures on “QTL mapping in MAGIC populations with R/qt12” in Horticulture 615 (Genetic Mapping), University of Wisconsin–Madison	
2008 – 2021	Lecture on my consulting experiences in Statistical Consulting (Stat 998), Department of Statistics, University of Wisconsin–Madison	
2020	Lecture on “Steps toward reproducible research” in BMI 877 (Statistical Methods for Molecular Biology), Department of Biostatistics & Medical Informatics, University of Wisconsin–Madison	



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 – 2020	Lecture on “Steps toward reproducible research” 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 – 2018	Workshop on Reproducible Research, Summer Institute in Statistics for Big Data, Seattle, Washington
2017 – 2018	Lecture on “Steps toward reproducible research” for the Summer Research Program in Biomedical Data Science, Department of Biostatistics & Medical Informatics, University of Wisconsin–Madison
2016 – 2018	Instructor, Data Carpentry workshops, Advanced Computing Initiative, University of Wisconsin–Madison
2013 – 2018	Lecture on “Creating effective figures and tables” to MD/PhD students, School of Medicine and Public Health, 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
2017	Lecture on “Genetics of extreme body size evolution in mice from Gough Island” for the Summer Research Program in Biomedical Data Science, Department of Biostatistics & Medical Informatics, University of Wisconsin–Madison
2008 – 2017	Periodic seminars on “Creating effective figures and tables” in the Department of Pathology and Laboratory Medicine, University of Wisconsin–Madison
2016	Lecture on “Creating effective figures and tables” at the Demography Training Seminar, Center for Demography of Health and Aging, University of Wisconsin–Madison
2008 – 2016	Instructor and co-organizer, Short Course on Systems Genetics, The Jackson Laboratory, Bar Harbor, Maine
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
2015	Instructor, Software Carpentry workshop, Washington State University, Pullman, Washington
2014 – 2015	Instructor, Software Carpentry workshops, Advanced Computing Initiative, University of Wisconsin–Madison
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

2022 – present	Scholarly Communication Advisory Group, University of Wisconsin–Madison
2020 – present	Executive Committee, Plant Breeding and Plant Genetics PhD Program, University of Wisconsin–Madison
2017 – present	Faculty Senator, 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)
2012 – 2014	Steering Committee, Medical Scientist Training Program, School of Medicine and Public Health, University of Wisconsin–Madison
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	Steering Committee, Biostatistics Computing Group, Department of Biostatistics and Medical Informatics, University of Wisconsin–Madison
2014 – 2022	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 co-PI with Gary Churchill (Jackson Laboratory) <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> Role: Co-Principal investigator	07/01/15 – 07/31/23	NIH/NIGMS (25%)
A Unified High-Performance Web Service for Systems Genetics and Precision Medicine Robert W. Williams and Saunak Sen, PIs <i>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.</i> Role: Co-investigator	04/15/17 – 07/31/25	NIH/NIGMS (10%)
A Resource for the Genetic Dissection of Complex Traits Stuart Macdonald and Tony Long, PIs <i>Enhance the usability of the Drosophila Synthetic Population Resource by integrating analysis software into R/qt12, enable extreme QTL mapping, and explore the nature of expression regulation with developing dynamic eQTL mapping methods.</i> Role: Co-investigator	01/01/23 – 12/31/26	NIH (10%)

### Previous Grant Support

NIAID Centers of Excellence for Influenza Research and Surveillance Yoshihiro Kawaoka, PI <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> Role: Co-investigator	04/01/14 – 08/31/21	NIH/NIAID (8%)
A Program of Research in Population Cytogenetics Terry Hassold (Washington State), PI <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> Role: Co-investigator	12/01/10 – 07/31/21	NIH/NICHD (8%)

- 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
- Genetics of the Island Rule  
 Bret Payseur, PI 09/10/12 – 02/28/21 NIH/NIGMS (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
- Collaborative Cross of the Microbiome and Metabolic Disease  
 Federico Rey, PI 09/23/15 – 08/31/20 NIH/NIDDK (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
- 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 <i>Identify genetic loci contributing to susceptibility to autoimmune myocarditis in mice.</i> Role: Co-Investigator	07/01/04 – 06/30/07	NIH/NHLBI (4%)
Catechol-O-methyltransferase and Breast Cancer James Yager, PI <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> Role: Co-Investigator	09/21/04 – 06/30/07	NIH/NCI (2.5%)
Core Center Grant: Biostatistical Center Sheila West, PI <i>Provide biostatistics support for epidemiological research in ophthalmology.</i> Role: Senior Biostatistician	07/01/04 – 06/30/07	NIH/NEI (5%)
Older Americans Independence Center Linda Fried, PI <i>The Center is dedicated to developing the next generation of research to determine the causes and treatments for frailty in older adults.</i> Role: Advisory Board Member	06/01/03 – 06/30/07	NIH/NIA (1.5%)
Statistical Methods for Genetic Epidemiology Kung-Yee Liang, PI; Karl Broman, acting PI <i>Develop and implement new statistical methodology useful for genetic epidemiologic studies of complex chronic diseases.</i> Role: Co-Investigator	12/01/00 – 11/30/05	NIH/NIGMS (25%)
Portable Software for Mapping Quantitative Traits Ken Manly, PI <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> Role: Co-Investigator	09/24/04 – 08/31/05	NIH/NHGRI (5%)
Center for Craniofacial Development and Disorders Terri Beaty, PI <i>Biostatistical Core for program project on the genetics of craniofacial disorders.</i> Role: Co-Investigator	08/01/01 – 08/01/04	NIH/NIDR (5%)
Mouse QTL in Endotoxic Shock Roger Reeves, PI <i>Identify genomic regions contributing to susceptibility to endotoxic shock in mice.</i> Role: Co-Investigator	08/01/01 – 07/30/05	NIH (10%)
Genetic Basis of Nanophthalmos Olof Sundin, PI <i>Identify the gene responsible for nanophthalmos in a single large pedigree.</i> Role: Co-Investigator	08/15/01 – 06/30/04	NIH/NEI (10%)
Center for Craniofacial Development and Disorders Ethylin Jabs, PI <i>Map and identify genes contributing to susceptibility to craniofacial disorders by linkage in multiplex families.</i> Role: Co-Investigator	08/01/99 – 04/30/04	NIH/NIDR (10%)



The Genetics of Age Related Cataract in Salisbury Nathan Congdon, PI <i>Identify genes contributing to susceptibility to cataract</i> Role: Co-Investigator	09/30/00 – 08/31/03	NIH/NIA (10%)
JHSPH Faculty Innovation Fund grant Karl Broman, PI <i>Applications of tree-based models to identify epistatic interactions between QTLs in model organisms.</i> Role: Principal Investigator	05/01/01 – 04/30/02	JHSPH (30%)

## INVITED PRESENTATIONS

### Scientific Meetings

- 2021    csv,conf (*online*)  
Data Mishaps Night (*online*)
- 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

- 2023 BIG Collection Sequence of Convenings, Big 10 Academic Alliance Libraries (*online*)  
Computation and Informatics in Biology and Medicine (CIBM), University of Wisconsin–Madison (*online*)
- 2021 Department of Biomedical Informatics, University of Pittsburgh (*online*)  
NIDA Center of Excellence in Omics, Systems Genetics, and the Addictome (*online*)
- 2020 Center for Quantitative Methods and Data Science, Tufts Medical Center (*online*)
- 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