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ACADEMIC APPOINTMENTS

9/2022 - ASSOCIATE PROFESSOR
Department of Biostatistics
University of Texas MD Anderson Cancer Center

9/2022 - ADJUNCT ASSOCIATE PROFESSOR
Department of Statistics
Rice University

7/2016 - 8/2022 ASSISTANT PROFESSOR
Department of Biostatistics
University of Texas MD Anderson Cancer Center

10/2018 - 8/2022 ADJUNCT ASSISTANT PROFESSOR
Department of Statistics
Rice University

EDUCATION AND TRAINING

1/2014 - 6/2016 POSTDOCTORAL SCHOLAR, Biomedical Data Science, Stanford University
Research focus: False discovery rate control in genomics
Advisor: Chiara Sabatti

8/2009 - 12/2013 PHD, Statistics, Rice University
Dissertation: Bayesian graphical models for biological network inference
Advisor: Marina Vannucci

9/2001 - 6/2005 AB, Applied Mathematics, Harvard University

RESEARCH INTERESTS

Theory & methods: graphical models, variable selection, Bayesian statistics, data integration
Applications: biological networks, cancer, microbiome, genetics, proteomics

GRANTS

GRANTS AS PI OR CO-PI

2022 - 2026 NIH/NHLBI R01
Title: New data science approaches to visualize and understand the impact of the microbiome on risk of graft-versus-host disease. Award number: R01 HL158796
Role: PI

2021 - 2024 NATIONAL SCIENCE FOUNDATION (NSF) – Division of Mathematical Sciences (DMS)
Title: Collaborative Research: Covariate-Driven Approaches to Network Estimation. Award number: 2113602/2113557
Role: co-PI (PI: Dr. Marina Vannucci)

2018 - 2021 NATIONAL SCIENCE FOUNDATION (NSF) – Division of Mathematical Sciences (DMS)
Title: Collaborative Research: Bayesian Network Estimation across Multiple Sample Groups and Data Types. Award number: 1811568/1811445

2018 - 2021 Role: co-PI (PI: Dr. Marina Vannucci)
CANCER PREVENTION & RESEARCH INSTITUTE OF TEXAS (CPRIT)
Title: Pathogenesis and Early Progression of Lung Cancer. Award number: RP150521
Role: co-PI, Biostatistics and Computational Biology Core (PI: Dr. Ignacio Wistuba)

COLLABORATIVE GRANTS

Extensive collaborative funding, consistently > 80% salary on grants

EXPERIENCE

- 1/2014 - 6/2016 POSTDOCTORAL SCHOLAR, Stanford University
- Developed and applied statistical methods to control the rate of false discoveries when assessing the genetic underpinnings of multivariate traits
 - Spearheaded involvement in Genotype-Tissue Expression (GTEx) consortium by participating in teleconferences and in-person meetings
 - Released R package implementing error control procedures
- 08/2010 - 12/2013 GRADUATE RESEARCH ASSISTANT, Rice University
- Developed Bayesian methods for the analysis of high-throughput biological data
 - Performed extensive collaborative research including analysis of NMR spectroscopy and genetic polymorphism data
 - Gained experience in Bayesian methodology, including variable and graph selection, and in applications such as genetic association studies and inference of biological networks
- 8/2005 - 7/2009 SOFTWARE DESIGN ENGINEER, Microsoft
- Designed and implemented document management features for Microsoft Office
 - Performed extensive programming and debugging in C++ and C#
 - Earned outstanding contribution ranking in 2006, promoted in 2007 and 2009

AWARDS AND FELLOWSHIPS

- 2020 Nominee, Robert M. Chamberlain Distinguished Mentor Award, MD Anderson Postdoctoral Association
- 2015 Savage Award for best dissertation in applied methodology, International Society for Bayesian Analysis (ISBA)
- 2014 Postdoctoral Fellowship, Stanford Center for Computational, Evolutionary, and Human Genomics (CEHG)
- 2014 Section on Bayesian Statistical Science (SBSS) student paper competition award winner
- 2011 - 2013 Predoctoral Fellowship, National Library of Medicine (NLM) Biomedical Informatics Research Training Program
- 2009 - 2011 Predoctoral Fellowship, T32 Training Grant in Biostatistics for Cancer Research, National Cancer Institute (NCI)
- 2009 - 2010 President's Graduate Fellowship, Rice University
- 2005 Phi Beta Kappa, Harvard University

PUBLICATIONS

PEER REVIEWED

Underlining denotes trainee supervised or co-supervised

Statistical methodology

1. [SHI Y](#), [ZHANG L](#), DO K, JENQ RR, **PETERSON CB**. (2022+) Sparse tree-based clustering of microbiome data to characterize microbiome heterogeneity in pancreatic cancer. *Journal of the Royal Statistical Society: Series C*. [preprint] [code]
2. [DAS P](#), **PETERSON CB**, NI Y, REUBEN A, ZHANG J, ZHANG J, DO K, BALADANDAYUTHAPANI V. (2022+) Bayesian hierarchical quantile regression with application to characterizing the immune architecture of lung cancer. *Biometrics*. [pdf] [code]
3. [QI X](#), ZHOU S, WANG Y, **PETERSON CB**. (2022) Bayesian sparse modeling to identify high-risk subgroups in meta-analysis of safety data. *Research Synthesis Methods*. **13**(6): 807–820. [pdf] [code]
4. [DAS P](#), DE D, MAITI R, KAMAL M, HUTCHESON KA, FULLER CD, CHAKRABORTY B, **PETERSON CB**. (2022) Estimating the optimal linear combination of predictors using spherically constrained optimization. *BMC Bioinformatics*. **23**(3): 436. [pdf] [code]
5. [OSBORNE N](#), **PETERSON CB**, VANNUCCI M. (2022) Latent network estimation and variable selection for compositional data via variational EM. *Journal of Computational and Graphical Statistics*. **31**(1): 163–175. [pdf] [code]
6. [ZHANG L](#), [SHI Y](#), DO K, **PETERSON CB**[†], AND JENQ RR[†]. (2021) ProgPerm: Progressive permutation for a dynamic representation of the robustness of microbiome discoveries. *BMC Bioinformatics*. **22**: 1–21. [†]Co-senior authors. [pdf] [code] [Shiny app]
7. BOGOMOLOV M*, **PETERSON CB***, BENJAMINI Y, SABATTI C. (2021) Hypotheses on a tree: new error rates and testing strategies. *Biometrika*. **108**(3): 575–590. *Authors contributed equally. [pdf] [R package]
8. [ZHANG L](#), [SHI Y](#), JENQ RR, DO K, **PETERSON CB**. (2021) Bayesian compositional regression with structured priors for microbiome feature selection. *Biometrics*. **77**(3): 824–838. [pdf] [code]
9. HA MJ, KIM J, GALLOWAY-PEÑA J, DO KA, **PETERSON CB**. (2020) Compositional zero-inflated network estimation for microbiome data. *BMC Bioinformatics*. **21**:1–20. [pdf] [code]
10. [SHI Y](#), [ZHANG L](#), DO K, **PETERSON CB**[†], JENQ R[†]. (2020) aPCoA: covariate adjusted principal coordinates analysis. *Bioinformatics*. **36**(13): 4099–4101. [†]Co-senior authors. [pdf] [R package] [Shiny app]
11. **PETERSON CB**, [OSBORNE N](#), STINGO FC, BOURGEAT P, DOECKE JD, VANNUCCI M. (2020) Bayesian modeling of multiple structural connectivity networks during the progression of Alzheimer’s disease. *Biometrics*. **76**(4): 1120–1132. [pdf] [code]
12. [DAS P](#), **PETERSON CB**, DO K, AKBANI R, BALADANDAYUTHAPANI V. (2020) NExUS: Bayesian simultaneous network estimation across unequal sample sizes. *Bioinformatics*. **36**(3): 798–804. [pdf] [code]
13. SHADDOX E, **PETERSON CB**, STINGO FC, HANANIA N, CRUICKSHANK-QUINN C, KECHRIS K, BOWLER R, VANNUCCI M. (2020) Bayesian inference of networks across multiple sample groups and data types. *Biostatistics*. **21**(3): 561–576. [pdf] [code]
14. KIM J, DO K, HA MJ, **PETERSON CB**. (2019) Bayesian inference of hub nodes across multiple networks. *Biometrics*. **75**(1): 172–182. [pdf] [code]
15. CREMASCHI A, ARGIENTO R, [SHOEMAKER K](#), **PETERSON CB**, VANNUCCI M. (2019) Hierarchical normalized completely random measures for robust graphical modeling. *Bayesian Analysis*. **14**(4): 1271–1301. [pdf]
16. SHADDOX E, STINGO F, **PETERSON CB**, JACOBSON S, CRUICKSHANK-QUINN C, KECHRIS K, BOWLER R, VANNUCCI M. (2018) A Bayesian approach for learning gene networks underlying disease severity in COPD. *Statistics in Biosciences*. **10**(1): 59–85. [pdf] [code]
17. BRZYSKI D, **PETERSON CB**, SOBczyk P, CANDÉS EJ, BOGDAN M, SABATTI C. (2017) Controlling the rate of GWAS false discoveries. *Genetics*. **205**(1): 61–75. [pdf]

18. **PETERSON CB**, BOGOMOLOV M, BENJAMINI Y, SABATTI C. (2016) TreeQTL: hierarchical error control for eQTL findings. *Bioinformatics*. **32**(16): 2556–2558. [pdf] [R package]
19. **PETERSON CB**, BOGOMOLOV M, BENJAMINI Y, SABATTI C. (2016) Many phenotypes without many false discoveries: Error controlling strategies for multi-trait association studies. *Genetic Epidemiology*. **40**(1): 45–56. [pdf]
20. **PETERSON CB**, STINGO FC, VANNUCCI M. (2016) Joint Bayesian variable and graph selection for regression models with network-structured predictors. *Statistics in Medicine*. **35**(7): 1017–1031. [pdf] [code]
21. **PETERSON CB**, STINGO FC, VANNUCCI M. (2015) Bayesian inference of multiple Gaussian graphical models. *Journal of the American Statistical Association*. **110**(509): 159–174.[pdf] [code]
22. **PETERSON CB**, VANNUCCI M, KARAKAS C, CHOI W, MA L, MALETIĆ-SAVATIĆ M. (2013) Inferring metabolic networks using the Bayesian adaptive graphical lasso with informative priors. *Statistics and Its Interface*. **6**(4): 547–558. [pdf]
23. ALLEN GI, **PETERSON CB**, VANNUCCI M, AND MALETIĆ-SAVATIĆ, M. (2013) Regularized partial least squares with an application to NMR spectroscopy. *Statistical Analysis and Data Mining*. **6**(4): 302–314. [pdf]

Statistical applications and collaborations: Microbiome research

24. SCHWABKEY Z, WIESNOSKI DH, CHANG C, TSAI W, PHAM D, ..., **PETERSON CB**, DO KA, ZHANG L, SHI Y, ..., JENQ RR. (2022) Diet-derived metabolites and mucus link the gut microbiome to fever after cytotoxic cancer treatment. *Science Translational Medicine*. **14**(671): eabo3445.
25. SCHMIESTER M, MAIER R, RIEDEL R, DUREK P, FRENTSCH M, KOLLING S, MASHREGHI MF, JENQ R, ZHANG L, **PETERSON CB**, BULLINGER L, CHANG H, NA I. (2022) Flow cytometry can reliably capture gut microbial composition in healthy adults as well as dysbiosis dynamics in patients with aggressive B-cell non-Hodgkin lymphoma. *Gut Microbes*. **14**(1): 2081475.
26. FRANKLIN S, AITKEN SL, SHI Y, SAHASRABHOJANE PV, ROBINSON S, **PETERSON CB**, ET AL. (2022) Oral and stool microbiome coalescence and its association with antibiotic exposure in acute leukemia patients. *Frontiers in Cellular and Infection Microbiology*. **12**: 848580.
27. SHI Y, ZHANG L, **PETERSON CB**[†], DO K[†], JENQ RR[†]. (2022) Performance determinants of unsupervised clustering methods for microbiome data. *Microbiome*. **10**(25): 1–12. [†]Authors contributed equally.
28. SPENCER CN, MCQUADE JL, GOPALAKRISHNAN V, MCCULLOCH JA, VETIZOU M, COGDILL AP, KHAN MA, ZHANG X, WHITE MG, **PETERSON CB**, WONG MC, ET AL. (2021) Dietary fiber and probiotics influence the gut microbiome and melanoma immunotherapy response. *Science*. **374**(6575): 1632–1640.
29. HAJJAR J, MENDOZA T, ZHANG L, FU S, PIHA-PAUL SA, HONG DS, JANKU F, KARP DD, BALLHAUSEN A, GONG J, ZARIFA A, **PETERSON CB**, ET AL. (2021) Associations between the gut microbiome and fatigue in cancer patients. *Scientific Reports*. **11**: 5847.
30. REYES-GIBBY CC, WANG J, ZHANG L, **PETERSON CB**, DO KA, ET AL. (2020) Oral microbiome and onset of oral mucositis in patients with squamous cell carcinoma of the head and neck. *Cancer*. **126**(23): 5124–5136.
31. ROBINSON S, **PETERSON CB**, SAHASRABHOJANE P, AJAMI NJ, SHELBURNE SA, KONTOYIANNIS DP, GALLOWAY-PEÑA JR. (2020) Observational cohort study of oral mycobiome and interkingdom interactions over the course of induction therapy for leukemia. *mSphere*. **5**(2): e00048-20.
32. GALLOWAY-PEÑA JR, SHI Y, **PETERSON CB**, SAHASRABHOJANE PV, GOPALAKRISHNAN V, BRUMLOW CE, ET AL. (2020) Gut microbiome signatures are predictive of infectious risk following induction therapy for acute myeloid leukemia. *Clinical Infectious Diseases*. **71**(1): 63–71.

33. RIQUELME E, ZHANG Y, ZHANG L, MARIA M, MICHELLE Z, DONG W, . . . , **PETERSON CB**, ET AL. (2019) Tumor microbiome diversity and composition influence pancreatic cancer outcomes. *Cell*. **178**(4): 795–806.e12.
34. GALLOWAY-PEÑA JR, **PETERSON CB**, MALIK F, SAHASRABHOJANE PV, SHAH DP, BRUMLOW CE, ET AL. (2019) Fecal microbiome, metabolites, and stem cell transplant outcomes: a single-center pilot study. *Open Forum Infectious Diseases*.
35. JIANG Z, JENQ RR, AJAMI NJ, PETROSINO JF, ALEXANDER AA, KE S, IQBAL T, DUPONT AW, MULDREW K, SHI Y, **PETERSON CB**, DO K, DUPONT HL. (2018) Safety and preliminary efficacy of orally administered lyophilized fecal microbiota product compared with frozen product given by enema for recurrent clostridium difficile infection: a randomized clinical trial. *PLoS ONE*. **13**(11): e0205064.

Statistical applications and collaborations: Medical physics

36. NETHERTON T, NGUYEN C, CARDENAS CE, CHUNG C, KLOPP AH, COLBERT LE, RHEE DJ, **PETERSON CB**, HOWELL R, BALTER P, COURT LE. (2022) An automated treatment planning framework for spinal radiotherapy and vertebral level second check. *International Journal of Radiation Oncology*Biography*Physics*. **114**(3): 516–528.
37. HARTZELL S, GUAN F, TAYLOR P, **PETERSON CB**, TADDEI P, KRY S. (2021) Uncertainty in tissue equivalent proportional counter assessments of microdosimetry and RBE estimates in carbon radiotherapy. *Physics in Medicine & Biology*. **66**(15): 155018.
38. HE Y, CAZOULAT G, WU C, **PETERSON CB**, McCULLOCH M, ANDERSON B, POLLARD?LARKIN J, BALTER P, LIAO Z, MOHAN R, BROCK K. (2021) Geometric and dosimetric accuracy of deformable image registration between average-intensity images for 4DCT-based adaptive radiotherapy for non-small cell lung cancer. *Journal of Applied Clinical Medical Physics*. **22**(8): 156–67.
39. COLEN RR, ROLFO C, AK M, AYOUB M, AHMED S, ELSHAFAEY N, MAMINDLA P, ZINN PO, NG C, VIKRAM R, BAKAS S, **PETERSON CB**, ET AL. (2021) Radiomics analysis for predicting pembrolizumab response in patients with advanced rare cancers. *Journal for Immunotherapy of Cancer*. **9**(4): e001752.
40. OLANREWAJU A, COURT LE, ZHANG L, NAIDOO K, BURGER H, . . . , **PETERSON CB**, BENSON KR, DU TOIT M, VAN REENEN R, BEADLE BM. (2021) Clinical acceptability of automated radiation treatment planning for head and neck cancer using the radiation planning assistant. *Practical Radiation Oncology*. **11**(3): 177-184.
41. RIGAUD B, ANDERSON BM, YU ZH, GOBELI M, CAZOULAT G, . . . , **PETERSON CB**, COURT LE, SVENSSON S, LÖFMAN F, KLOPP AH, BROCK KK. (2021) Automatic segmentation using deep learning to enable online dose optimization during adaptive radiation therapy of cervical cancer. *International Journal of Radiation Oncology*Biography*Physics*. **109**(4): 1096–1110.
42. VASSILIEV ON, **PETERSON CB**, CHANG JY, MOHAN R. (2021) Using FFF beams to improve the therapeutic ratio of lung SBRT. *Journal of Radiotherapy in Practice*. **20**(4): 419–425.
43. NETHERTON TJ, RHEE DJ, CARDENAS CE, CHUNG C, KLOPP AH, **PETERSON CB**, HOWELL RM, BALTER PA, COURT LE. (2020) Evaluation of a multiview architecture for automatic vertebral labeling of palliative radiotherapy simulation CT images. *Medical Physics*. **47**(11): 5592–5608.
44. BRANCO D, KRY S, TAYLOR P, RONG J, ZHANG X, **PETERSON CB**, FRANK S, FOLLOWILL D. (2020) Development of a stereoscopic CT metal artifact management algorithm using gantry angle tilts for head and neck patients. *Journal of Applied Clinical Medical Physics*. **21**(8): 120–130.
45. GLENN MC, **PETERSON CB**, HOWELL RM, FOLLOWILL DS, POLLARD-LARKIN JM, KRY SF. (2020) Sensitivity of IROC phantom performance to radiotherapy treatment planning system beam modeling parameters based on community-driven data. *Medical Physics*. **47**(10): 5250–5259.

46. McCULLOCH MM, CAZOULAT G, FORD AC, ELGOHARI B, BAHIG H, . . . , **PETERSON CB**, ET AL. (2020) Biomechanical modeling of radiation dose-induced volumetric changes of the parotid glands for deformable image registration. *Physics in Medicine and Biology*. **65**(16): 165017.
47. EDWARD SS, ALVAREZ PE, TAYLOR PA, MOLINEU HA, **PETERSON CB**, FOLLOWILL DS, KRY SF. (2020) Differences in the patterns of failure between IROC lung and spine phantom irradiations. *Practical Radiation Oncology*. **10**(5): 372–381.
48. EDWARD SS, GLENN MC, **PETERSON CB**, BALTER PA, POLLARD-LARKIN JM, HOWELL RM, FOLLOWILL DS, KRY SF. (2020) Dose calculation errors as a component of failing IROC lung and spine phantom irradiations. *Medical Physics*.
49. VASSILIEV ON, **PETERSON CB**, GROSSHANS DR, MOHAN R. (2020) A simple model for calculating relative biological effectiveness of X-rays and gamma radiation in cell survival. *The British Journal of Radiology*. **93**: 20190949.
50. TINOCO M, WAGA E, TRAN K, VO H, BAKER J, HUNTER R, **PETERSON CB**, TAKU N, COURT L. (2020) RapidPlan development of VMAT plans for cervical cancer patients in low- and middle-income countries. *Medical Dosimetry*. **45**(2): 172–178.
51. CHEN C, HUNG G, SHEN T, **PETERSON CB**, PAN T. (2020) Comparison of ejection fraction calculation between CT and SPECT at high heart rate – a dynamic cardiac phantom study. *Journal of Nuclear Cardiology*.
52. RIGAUD B, CAZOULAT G, VEDAM S, VENKATESAN AM, **PETERSON CB**, TAKU N, KLOPP AH, BROCK KK. (2020) Modeling complex deformations of the sigmoid colon between external beam radiotherapy and brachytherapy images of cervical cancer. *International Journal of Radiation Oncology * Biology * Physics*. **106**(5): 1084–1094.
53. GLENN MC, **PETERSON CB**, FOLLOWILL DS, HOWELL RM, POLLARD-LARKIN JM, KRY SF. (2020) Reference dataset of users’ photon beam modeling parameters for the Eclipse, Pinnacle, and RayStation treatment planning systems. *Medical Physics*. **47**(1): 282–288.
54. MEIER JG, ERASMUS JJ, GLADISH GW, **PETERSON CB**, DIAB RH, MAWLAWI OR. (2019) Characterization of continuous bed motion effects on patient breathing and respiratory motion correction in PET/CT imaging. *Journal of Applied Clinical Medical Physics*.
55. VASSILIEV ON, **PETERSON CB**, CAO W, GROSSHANS DR, MOHAN R. (2019) Systematic microdosimetric data for protons of therapeutic energies calculated with Geant4-DNA. *Physics in Medicine & Biology*. **64**(21): 215018.
56. RHEE DJ, CARDENAS CE, ELHALAWANI H, MCCARROLL R, ZHANG L, YANG J, GARDEN AS, **PETERSON CB**, BEADLE BM, COURT LE. (2019) Automatic detection of contouring errors using convolutional neural networks. *Medical Physics*. **46**(11): 5086–5097.
57. McCULLOCH M, ANDERSON B, CAZOULAT G, **PETERSON CB**, MOHAMED A, VOLPE S, ET AL. (2019) Biomechanical modeling of neck flexion for deformable alignment of the salivary glands in head and neck cancer images. *Physics in Medicine and Biology*. **64**(17): 175018.
58. KRY S, GLENN M, **PETERSON CB**, BRANCO D, MEHRENS H, STEINMANN A, FOLLOWILL D. (2019) Independent recalculation outperforms traditional measurement-based IMRT QA methods in detecting unacceptable plans. *Medical Physics*. **46**(8): 3700–3708.
59. MCCARROLL RE, BEADLE BM, BALTER PA, BURGER H, CARDENAS CE, DALVIE S, . . . , **PETERSON CB**, VORSTER K, WETTER J, ZHANG L, COURT LE, YANG J. (2018) Retrospective validation and clinical implementation of automated contouring of organs at risk in the head and neck: a step toward automated radiation treatment planning for low- and middle-income countries. *Journal of Global Oncology*.
60. RUBINSTEIN A, GAY S, **PETERSON CB**, KINGSLEY CV, TAILOR RC, POLLARD-LARKIN JM, MELANCON AD, FOLLOWILL DS, COURT LE. (2018) Radiation-induced lung toxicity in mice irradiated in a strong magnetic field. *PLoS ONE*. **13**(11): e0205803.

61. OWENS CA, **PETERSON CB**, TANG C, KOAY EJ, YU W, MACKIN DS, LI J, SALEHPOUR MR, FUENTES DT, COURT LE, AND YANG J. (2018) Lung tumor segmentation methods: impact on the uncertainty of radiomics features for non-small cell lung cancer. *PLoS ONE*. **13**(10): e0205003.
62. KISLING KD, GER RB, NETHERTON TJ, CARDENAS CE, OWENS CA, ANDERSON BM, ..., **PETERSON CB**, COURT LE, DUBE S. (2018) A snapshot of medical physics practice patterns. *Journal of Applied Clinical Medical Physics*. **19**(6): 306–315.
63. VASSILIEV ON, KRY SF, WANG HC, **PETERSON CB**, CHANG JY, MOHAN R. (2018) Radiotherapy of lung cancers: FFF beams improve dose coverage at tumor periphery compromised by electronic disequilibrium. *Physics in Medicine & Biology*.
64. KRY S, **PETERSON CB**, HOWELL R, IZEWSKA J, LYE J, CLARK C, ET AL. (2018) Remote beam output audits: a global assessment of results out of tolerance. *Physics & Imaging in Radiation Oncology*. **7**: 39–44.
65. COURT LE, KISLING K, MCCARROLL R, ZHANG L, YANG J, SIMONDS H, ..., **PETERSON CB**, BEADLE B. (2018) Radiation planning assistant – A streamlined, fully automated radiotherapy treatment planning system. *The Journal of Visualized Experiments*. **134**: e57411.

Statistical applications and collaborations: Immunotherapy

66. MENDOZA T, SHESHADRI A, ALTAN M, HESS K, GEORGE G, STEPHEN B, CASTILLO L, RODRIGUEZ E, GONG J, **PETERSON CB**, AHNERT JR, ET AL. (2020) Evaluating the psychometric properties of the Immunotherapy module of the MD Anderson Symptom Inventory. *Journal for Immunotherapy of Cancer*. **8**(2): e000931.

Statistical applications and collaborations: Leukemia

67. THOMPSON P, JIANG X, BANERJEE P, BASAR R, GARG N, CHEN K, KAPLAIN M, NUNEZ CORTES A, FERRAJOLI A, KEATING M, **PETERSON CB**, ANDREEFF M, REZVANI K, WIERDA W. (2022) A phase two study of high-dose blinatumomab in Richter’s syndrome. *Leukemia*. **36**(9): 2228–2232.
68. THOMPSON PA, SRIVASTAVA J, **PETERSON CB**, STRATI P, JORGENSEN JL, HETHER T, ET AL. (2019) Minimal residual disease undetectable by next-generation sequencing predicts improved outcome in CLL after chemoimmunotherapy. *Blood*. **134**(22): 1951–1959.
69. STRATI P, TAKAHASHI K, **PETERSON CB**, KEATING MJ, THOMPSON PA, DAVER NG, ET AL. (2019) Efficacy and predictors of response of lenalidomide and rituximab in patients with treatment-naïve and relapsed CLL. *Blood Advances*. **3**(9): 1533–1539.
70. THOMPSON PA, **PETERSON CB**, STRATI P, JORGENSEN J, KEATING MJ, O’BRIEN SM, ET AL. (2018) Serial minimal residual disease (MRD) monitoring during first-line FCR treatment for CLL may direct individualized therapeutic strategies. *Leukemia*. **32**(11): 2388–2398.

Statistical applications and collaborations: Ovarian cancer

71. COFFIN T, BOWEN D, SWISHER E, LU K, RAYES N, ..., **PETERSON CB**, ET AL. (2022) An accessible communication system for population-based genetic testing: development and usability study. *JMIR Formative Research*. **6**(10): e34055.
72. COFFIN T, BOWEN D, LU K, SWISHER E, RAYES N, ..., **PETERSON CB**, ET AL. (2022) Using social media to facilitate communication about women’s testing: tool validation study. *JMIR Formative Research*. **6**(9): e35035.

73. RAYES N, BOWEN DJ, COFFIN T, NEBGEN D, **PETERSON CB**, MUNSELL MF, ET AL. (2019) MAGENTA (Making Genetic testing accessible): a prospective randomized controlled trial comparing online genetic education and telephone genetic counseling for hereditary cancer genetic testing. *BMC Cancer*. 19:648.

Statistical applications and collaborations: Kidney cancer

74. LIU X, KONG W, **PETERSON CB**, MCGRAIL DJ, HOANG, ET AL. (2020) PBRM1 loss defines a nonimmunogenic tumor phenotype associated with checkpoint inhibitor resistance in renal carcinoma. *Nature Communications*. 11(1): 1–14.

Statistical applications and collaborations: Head and neck cancer

75. BARBON CE, **PETERSON CB**, MORENO AC, LAI SY, REDDY JP, SAHLI A, MARTINO R, JOHNSON FM, FULLER CD, HUTCHESON KA. (2022) Adhering to eat and exercise status during radiotherapy for oropharyngeal cancer for prevention and mitigation of radiotherapy-associated dysphagia. *JAMA Otolaryngology*.
76. BARBON CE, YAO CM, **PETERSON CB**, MORENO AC, GOEPFERT RP, JOHNSON FM, CHRONOWSKI GM, FULLER CD, GROSS ND, HUTCHESON KA. (2021) Swallowing after primary TORS and unilateral or bilateral radiation for low-to intermediate-risk tonsil cancer. *Otolaryngology–Head and Neck Surgery*. 167(3): 484–493.

Statistical applications and collaborations: Cancer biomarkers and drug discovery

77. LIM B, **PETERSON CB**, DAVIS A, CHO E, PEARSON T, LIU H, HWANG M, UENO NT, LEE J. (2021) ONC201 and an MEK inhibitor trametinib synergistically inhibit the growth of triple-negative breast cancer cells. *Biomedicines*. 9(10):1410.
78. MCGRAIL DJ, PILIÉ PG, DAI H, LAM TN, LIANG Y, VOORWERK L, KOK M, ZHANG XH, ROSEN JM, HEIMBERGER AB, **PETERSON CB**, JONASCH E, LIN S. (2021) Replication stress response defects are associated with response to immune checkpoint blockade in nonhypermuted cancers. *Science Translational Medicine*. 13(617): eabe6201.
79. FAHRMANN JF, WASYLISHEN AR, PIETERMAN CR, IRAJIZAD E, VYKOUKAL J, MURAGE E, WU R, DENNISON JB, KRISHNA H, **PETERSON CB**, LOZANO G, ET AL. (2021) A blood-based polyamine signature associated with MEN1 duodenopancreatic neuroendocrine tumor progression. *The Journal of Clinical Endocrinology & Metabolism*. 106(12): e4969–80.
80. BRADLEY SD, TALUKDER AH, LAI I, DAVIS R, ALVAREZ H, . . . , **PETERSON CB**, ET AL. (2020) Vestigial-like 1 is a shared targetable cancer-placenta antigen expressed by pancreatic and basal-like breast cancers. *Nature Communications*. 11(1): 1–12.
81. VYKOUKAL J, FAHRMANN JF, GREGG JR, TANG Z, BASOURAKOS S, . . . , **PETERSON CB**, DAVIS JW, KIM J, HANASH S, THOMPSON TC. (2020) Caveolin-1-mediated sphingolipid oncometabolism underlies a metabolic vulnerability of prostate cancer. *Nature Communications*. 11(1): 1–6.
82. WU X, PARK M, SARBASSOVA DA, YING H, LEE MG, BHATTACHARYA R, ELLIS L, **PETERSON CB**, HUNG MC, LIN HK, BERSIMBAEV RI, SONG MS, SARBASSOV, DD. (2020) A chirality-dependent action of vitamin C in suppressing KRAS mutant tumor growth by the oxidative combination: rationale for cancer therapeutics. *International Journal of Cancer*. 146(10): 2822–2828.
83. CHARI NS, IVAN C, LE X, LI J, MIJITI A, PATEL AA, OSMAN AA, **PETERSON CB**, ET AL. (2020) Disruption of TP63-miR-27a* feedback loop by mutant TP53 promotes head and neck cancer progression. *Journal of the National Cancer Institute*. 112(3): 266–277.

84. FAHRMANN JF, VYKOUKAL J, FLEURY A, TRIPATHI S, DENNISON JB, MURAGE E, ..., **PETERSON CB**, KATAYAMA H, DISIS ML, ARUN B, HANASH S. (2020) Association between plasma diacetylspermine and tumor spermine synthase with outcome in triple negative breast cancer. *Journal of the National Cancer Institute*. **112**(6): 607–616.

Statistical applications and collaborations: Genetics, genomics, and proteomics

85. JASINSKA AJ, ZELAYA I, SERVICE SK, **PETERSON CB**, CANTOR RM, ET AL. (2017) Genetic variation and gene expression across multiple tissues and developmental stages in a non-human primate. *Nature Genetics*. **49**(12): 1714–1721.
86. GTEX CONSORTIUM [including **Peterston CB**]. (2017) Genetic effects on gene expression across human tissues. *Nature*. **550**(7675): 204–213. Contributed analysis, text, and figures.
87. **PETERSON CB**, SERVICE S, JASINSKA A, GAO F, ZELAYA I, TESHIBA T, BEARDEN C, REUS V, MACAYA G, LÓPEZ-JARAMILLO C, BOGOMOLOV M, BENJAMINI Y, ESKIN E, COPPOLA G, FREIMER N, SABATTI C. (2016) Characterization of expression quantitative trait loci in pedigrees from Colombia and Costa Rica ascertained for bipolar disorder. *PLoS Genetics*. **12**(5): e1006046.
88. REMBACH A, STINGO FC, **PETERSON CB**, VANNUCCI M, DO K, WILSON WJ, MACAULAY SL, RYAN TM, MARTINS RN, AMES D, MASTERS CL, DOECKE JD, THE AIBL RESEARCH GROUP. (2014) Bayesian graphical network analyses reveal complex biological interactions specific to Alzheimer’s Disease. *Journal of Alzheimer’s Disease*. **10**(4): P796–P797.
89. COWLEY AW, MORENO C, JACOB HJ, **PETERSON CB**, STINGO FC, AHN KW, LIU P, VANNUCCI M, LAUD PW, REDDY P, LAZAR J, EVANS L, YANG C, KURTH T, LIANG M. (2014) Characterization of biological pathways associated with a 1.37 Mbp genomic region protective of hypertension in Dahl S rats. *Physiological Genomics*. **46**(11): 398–410.
90. SWARTZ MD, **PETERSON CB**, LUPO PJ, WU X, FORMAN MR, SPITZ MR, HERNANDEZ LM, VANNUCCI M, SHETE S. (2013) Investigating multiple candidate genes and nutrients in the folate metabolism pathway to detect genetic and nutritional risk factors for lung cancer. *PLoS ONE*. **8**(1): e53475. doi:10.1371/journal.pone.0053475

BOOK CHAPTERS

91. **PETERSON CB**, STINGO F. (2021) Bayesian estimation of single and multiple graphs. In *Handbook of Bayesian Variable Selection*, MG Tadesse and M Vannucci (Eds). Chapman and Hall/CRC. 327–348.
92. **PETERSON CB**, SWARTZ MD, SHETE S, VANNUCCI M. (2013) Bayesian model averaging for genetic association studies. In *Advances in Statistical Bioinformatics: Models and Integrative Inference for High-Throughput Data*, K Do, Z Qin and M Vannucci (Eds). Cambridge University Press, 208–223.

OTHER PAPERS AND DISCUSSIONS

93. OSBORNE N, **PETERSON CB**, VANNUCCI M. (2020) Network estimation of compositional data. In *Book of Short Papers - Italian Statistical Society 2020*, Pollice A, Salvati N, Schirripa Spagnolo F (Eds). Pearson, 28–33.
94. **PETERSON CB**, STINGO FC. (2013) Invited discussion of “On the prior and posterior distributions used in graphical modelling” by Marco Scutari. *Bayesian Analysis*. **8**(3): 539–542.

THESIS

95. **PETERSON CB**. (2013) Bayesian graphical models for biological network inference. Doctoral thesis, Rice University.

TALKS

INVITED SEMINARS

New methods for microbiome data integration. Statistics Seminar, Department of Mathematical Sciences, The University of Texas at Dallas, Dallas, TX. February 11, 2023

New approaches for integrating microbiome and covariate data. Department of Population and Quantitative Health Sciences, Case Western Reserve University School of Medicine, Cleveland, OH. November 17, 2022

New approaches for integrating microbiome and covariate data. Center for Computational, Evolutionary and Human Genomics Seminar. Stanford University, Stanford, CA. October 26, 2022

New approaches for integrating microbiome and covariate data. Biostatistics Seminar. University of Pennsylvania, Philadelphia, PA. September 21, 2021

Visualization and feature selection for microbiome data. Biostatistics Seminar. Ohio State University, Columbus, OH. September 3, 2021

New approaches for visualization and clustering of microbiome data. Human Genetics Center Seminar. UTHealth School of Public Health, Houston, TX. February 1, 2021

New approaches for visualization and clustering of microbiome data. Cancer Biostatistics Seminar. University of Michigan, Ann Arbor, Michigan. September 11, 2020

Bayesian variable selection for microbiome data. Statistics Colloquium. Texas A&M University, College Station, Texas. January 17, 2020

Flexible and informative clustering of microbiome data. Statistics Colloquium. Rice University, Houston, Texas. September 16, 2019

Integrative network analyses using Bayesian graphical models. Biostatistics Seminar. Fred Hutchinson Cancer Research Center, Seattle, Washington. November 1, 2017

Bayesian inference of multiple Gaussian graphical models. Harvard/MIT Joint Econometrics Seminar. Harvard University, Cambridge, Massachusetts. November 3, 2016

CONFERENCE PRESENTATIONS

Bayesian sparse modeling to identify high-risk subgroups. Invited presentation. Joint Statistical Meetings, Washington, DC. August 9, 2022.

Identifying covariate-driven connections in directed networks. Invited presentation. ENAR Spring Meeting, Houston, TX. March 28, 2022.

Scalable Bayesian inference of networks and covariate effects. Invited presentation. Joint Statistical Meetings. August 12, 2021.

Flexible and informative clustering of microbiome data. Invited presentation. ICSA Applied Statistics Symposium, Houston, TX. December 12, 2020.

Efficient Bayesian estimation of microbiome association networks. Invited presentation. Joint Statistical Meetings, Philadelphia, PA. August 5, 2020.

Bayesian modeling of multiple structural connectivity networks during the progression of Alzheimer's disease. Invited presentation. ENAR Spring Meeting, Nashville, TN. March 25, 2020.

Bayesian variable selection for microbiome data. Invited presentation. iBRIGHT conference, Houston, TX. November 12, 2019.

A Bayesian classification model for radiomics data. Invited presentation. WNAR Annual Meeting, Portland, Oregon. June 25, 2019.

Bioinformatics tools to gain insight into proteomic and genomic data. Invited presentation. International VHL Medical/Research Symposium, Houston, Texas. October 4, 2018.

Bayesian hierarchical modeling for inference of multiple graphical models. Invited presentation. ENAR Spring Meeting, Atlanta, Georgia. March 27, 2018.

Bayesian multivariate modeling of pathways underlying disease severity in COPD. Invited presentation. ENAR Spring Meeting, Austin, Texas. March 9, 2016.

Savage Award winner: Approaches in Bayesian graphical modeling. Topic-contributed presentation. Joint Statistical Meetings, Seattle, Washington. August 10, 2015.

SBSS student paper award winner: Bayesian inference of multiple Gaussian graphical models. Topic-contributed presentation. Joint Statistical Meetings, Boston, Massachusetts. August 4, 2014.

Bayesian inference of multiple Gaussian graphical models. Invited presentation. Joint Applied Statistics Symposium of International Chinese Statistical Association & Korean International Statistical Society, Portland, Oregon. June 18, 2014.

Bayesian inference of multiple Gaussian graphical models. Topic-contributed presentation. Joint Statistical Meetings, Montreal, Canada. August 8, 2013.

Bayesian inference of multiple Gaussian graphical models. Contributed presentation. ENAR Spring Meeting, Orlando, Florida. March 12, 2013.

Inferring biological networks using the Bayesian graphical lasso with informative priors. Contributed presentation. Joint Statistical Meetings, San Diego, California. July 20, 2012.

Inferring metabolic networks using the Bayesian graphical lasso. Plenary presentation. NLM Informatics Training Conference, Madison, Wisconsin. June 27, 2012.

EDUCATION

PROGRAM AFFILIATIONS

- 2016 - REGULAR MEMBER, Quantitative Sciences program, The University of Texas MD Anderson Cancer Center UTHHealth Houston Graduate School of Biomedical Sciences (GSBS).
- 2018 - ADJUNCT ASSISTANT PROFESSOR, Statistics, Rice University.

TEACHING

- SPRING/FALL 2017–2022 *Guest lecturer*, Graduate Seminar in Statistics (STAT 600), Rice University.
- FALL 2019 *Course coordinator & guest lecturer*, Bayesian Data Analysis (GS01 1013), Graduate School of Biological Sciences.
- SPRING 2018 *Guest lecturer*, Professional Development for Bioinformatics (COMP 573), Rice University.
- OCTOBER 2016 *Instructor*, Understanding Diagnostic Tests (Continuing Medical Education seminar), General Internal Medicine, The University of Texas MD Anderson Cancer Center.
- FALL 2010 *Teaching Assistant*, Statistics for the Biosciences (STAT 305), Rice University. Held weekly lab focusing on data analysis in R and graded labs and final exams.
- FEBRUARY 2010 *Teaching Assistant*, Data Visualization Mini-Course, Rice University. Helped attendees successfully produce advanced graphics using R.
- FALL 2009 *Teaching Assistant*, Applied Probability (STAT 331), Rice University. Led weekly review and graded homework.
- FALL 2004 *Teaching Fellow*, Formal Systems and Computation (CS 121), Harvard University. Created lesson plans, taught weekly section, and composed both problem sets and exams.
- FALL 2002 *Course Assistant*, Calculus, Series, and Differential Equations (Math 1b), Harvard University. Led weekly review, graded homework, and offered drop-in tutoring at the Math Question Center.

MENTORSHIP

Current

PHD STUDENTS

- Jiawei Tu**, PhD student, Biostatistics, University of Texas School of Public Health. 2023–present
- Ziyi Wang**, PhD student, Biostatistics, University of Texas School of Public Health. 2022–present
- Licai Huang**, PhD student, Quantitative Sciences. 2022–present
- Yangfan Ren**, PhD student, Statistics, Rice University. Joint with Marina Vannucci. 2021–present
- Zachary Wooten**, PhD student, Statistics, Rice University. 2020–present. Recipient of National Science Foundation Graduate Research Fellowship Program (NSF GRFP) award, 2021.

POSTDOCS

- Satabdi Saha**. 2022–present

Alumni

DOCTORAL ALUMNI

- Sarah Robinson**, now Data Scientist II at Microsoft. PhD, Statistics, Rice University, 2022. Thesis title: Joint estimation and selection of multiple graphical models for microbiome data. Recipient of National Science Foundation Graduate Research Fellowship (NSF GRFP) award, 2019.
- Nathan Osborne**, now Senior Data Scientist at Intuit. PhD, Statistics, Rice University, 2021. Joint with Marina Vannucci. Thesis title: Advances in Bayesian approaches for directed and undirected graphical models. Student paper award winner, American Statistical Association (ASA) Statistical Computing and Graphics Section, 2020.

Xinyue Qi, now Manager of Biostatistics at Gilead Sciences. PhD, Biostatistics, University of Texas School of Public Health, 2020. Co-supervised with Shouhao Zhou. Thesis title: Bayesian modeling of censored data with application to meta-analysis of immunotherapy trials. Student paper award winner, ICSA Applied Statistics Symposium, 2020.

Katherine Shoemaker, now Assistant Professor of Statistics, Department of Mathematics & Statistics, University of Houston-Downtown. PhD, Statistics, Rice University, 2019. Thesis title: Statistical approaches for interpretable radiomics.

POSTDOC ALUMNI

Liangliang Zhang, now Assistant Professor of Biostatistics and Quantitative Health, Case Western Reserve University. Joint with Kim-Anh Do and Robert Jenq, 2017–2021

Briceön Wiley, now Professor of Practice, Department of Decision & Information Sciences, University of Houston. 2020–2021.

Yushu Shi, now Assistant Professor of Statistics, University of Missouri. Joint with Kim-Anh Do and Robert Jenq, 2017–2020.

Priyam Das, now Assistant Professor, Department of Biostatistics, Virginia Commonwealth University. Joint with Kim-Anh Do and Veera Baladandayuthapani, 2017–2019.

UNDERGRAD STUDENTS

Kendall Lemons, now PhD student at Weill Cornell Medicine. Summer intern while at Prairie View A&M University, Summer 2021.

PhD advisory committees

Zhichao Xu, PhD, Quantitative Sciences. In progress

Shan He, PhD, Quantitative Sciences. In progress

Paige Taylor, PhD, Medical Physics. In progress

Hunter Mehrens, PhD, Medical Physics. In progress

Barbara Marquez, PhD, Medical Physics. In progress

Fre'Etta Brooks, PhD, Medical Physics. In progress

Mary Gronberg, PhD, Medical Physics. In progress

Kareem Waheed, PhD, Medical Physics. In progress

Constance Owens, PhD, Medical Physics. In progress

Shannon Hartzell, PhD, Medical Physics. In progress

Sharbacha Edward, PhD, Medical Physics. In progress

Tucker Netherton, PhD, Medical Physics, 2021. Thesis title: A fully-automated, deep learning-based framework for computed tomography-based localization, segmentation, verification, and treatment planning of metastatic vertebrae

Cayla Wood, PhD, Medical Physics, 2021. Thesis title: Development of quantitative molecular photoacoustic imaging for noninvasive cancer diagnostics

Trevor Mitcham, PhD, Medical Physics, 2021. Thesis title: Ultrasound-mediated molecular imaging of the tumor microenvironment

Mallory Carson Glenn, PhD, Medical Physics, 2020. Thesis title: Characterization of treatment planning system photon beam modeling errors in IROC Houston phantom irradiations

Joseph Meier, PhD, Medical Physics, 2019. Thesis title: Assessment of new innovations in PET/CT for respiratory motion correction

Elin Shaddox, PhD, Statistics, Rice University. 2019. Thesis title: Bayesian graphical models for multiple networks

Youyi Zhang, PhD, Quantitative Sciences, 2018. Thesis title: Bayesian integrative analysis of omics data

Rachel McCarroll, PhD, Medical Physics, 2018. Thesis title: Equipment to address infrastructure and human resource challenges for radiotherapy in low-resource settings

Ashley Rubinstein, PhD, Medical Physics, 2017. Thesis title: A pre-clinical study of radiation-induced lung toxicity when irradiating in a strong magnetic field

Xenia Favé, PhD, Medical Physics, 2017. Thesis title: Detecting and evaluating therapy induced changes in radiomics features measured from non-small cell lung cancer to predict patient outcomes

Master's advisory committees

Shannon Hartzell, SMS, Medical Physics. 2019. Thesis title: Quantifying uncertainty in a measurement-based assessment of relative biological effectiveness in carbon ion radiotherapy

Brandon Lockett, SMS, Medical Physics. 2019. Thesis title: Commissioning of micro-cube thermoluminescent dosimeters for small field dosimetry quality assurance in radiotherapy

Examining committees

Fre'Etta Brooks. Medical Physics. Candidacy exam, May 2022

Mary Gronberg. Medical Physics. Candidacy exam, November 2020

Sharbacha Edward. Medical Physics. Candidacy exam, March 2020

Joseph Meier. Medical Physics. Candidacy exam, July 2019

Constance Owens. Medical Physics. Candidacy exam, March 2019

Tucker Netherton. Medical Physics. Candidacy exam, December 2018

Mallory Carson Glenn. Medical Physics. Candidacy exam, November 2017

SOFTWARE

R package **TreeBH**: Error control for tree-structured hypotheses

Available at <https://github.com/cbpeterson/TreeBH>

R package **TreeQTL**: Hierarchical error control in eQTL analysis

Available at <http://www.bioinformatics.org/treeqtl/>

Additional publicly available software

Available at <http://odin.mdacc.tmc.edu/~cbpeterson/software.html>

PROFESSIONAL ACTIVITIES

Biostatistical reviewer, National Institutes of Health (NIH) special emphasis panel, 2022, 2023

Panel member, National Science Foundation (NSF) grant review panel, 2017, 2020

Conference organizing committee member, iBRIGHT conference, 2019

Reviewer

Journal of the American Statistical Association

Journal of the Royal Statistical Society

Biometrika

Biometrics

Annals of Applied Statistics

Nature Cancer

Statistical Methods in Medical Research

Statistics and Computing

Genome Biology

Journal of Statistical Software

BMC Bioinformatics

Frontiers in Genetics

Journal of Computational Biology

Biostatistician, National Cancer Institute (NCI) Renal Task Force, 2017 - 2020

Judge, Section on Bayesian Statistical Science (SBSS) Student Paper Competition, 2016, 2017, 2020, 2022

Session Chair

ENAR Spring Meeting, 2018

Joint Statistical Meetings, 2012, 2014, 2015

Member, American Statistical Association (ASA), 2010 - present

INSTITUTIONAL SERVICE

Member, Institutional Review Board (IRB), 2019 -

Member, Medical Physics Program Steering Committee, 2017 - 2020

Member, Department of Biostatistics Faculty Search Committee, 2018 - 2019