

Benjamin Brewster Risk

CONTACT INFORMATION

Department of Biostatistics and Bioinformatics
Rollins School of Public Health
Emory University
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EDUCATION

Cornell University, Ithaca, NY

Ph.D., Statistics, August 2015

- Dissertation: *Topics in Independent Component Analysis, Likelihood Component Analysis, and Spatiotemporal Mixed Modeling*
- Advisors: David S. Matteson and David Ruppert

M.S., Statistics, January 2014

University of California Berkeley, Berkeley, CA

M.S., Environmental Science, Policy, and Management, May 2009

- Thesis: *A Robust-Design Formulation of the Incidence Function Model of Metapopulation Dynamics Applied to Two Species of Rails*
- Advisor: Steven R. Beissinger

Dartmouth College, Hanover, NH

B.A., Environmental and Evolutionary Biology, June 2003

- *summa cum laude*, with high major honors

ACADEMIC APPOINTMENTS

**Department of Biostatistics & Bioinformatics,
Emory University**, Atlanta, GA
Assistant Professor

July 2017 - Present

**Statistical and Applied Mathematical Sciences Institute and the Department
of Biostatistics, University of North Carolina, Chapel Hill**
Postdoctoral Research Associate

August 2015 - June 2017

- Mentors: Daniel Rowe and Hongtu Zhu

PUBLICATIONS

Methodology

1. R. J. Murden, Z. Zhang, Y. Guo, and **B. B. Risk**. Interpretive JIVE: Connections with CCA and an Application to Brain Connectivity. *Frontiers in Neuroscience*, 16: 2022.
2. M. B. Nebel, D. E. Lidstone, L. Wang, D. Benkeser, S. H. Mostofsky, **B. B. Risk**. Accounting for motion in resting-state fMRI: What part of the spectrum are we characterizing in autism spectrum disorder? *NeuroImage* 257: 119296, 15 August 2022.
3. Y. Zhao, D. S. Matteson, S. H. Mostofsky, M. B. Nebel, **B. B. Risk**. Group linear non-Gaussian component analysis with applications to neuroimaging. *Computational Statistics and Data Analysis*, 171: 107454, July 2022.

4. **B. B. Risk** and I. Gaynanova. Simultaneous non-Gaussian component analysis (SING) for data integration in neuroimaging. *Annals of Applied Statistics*, 15 (3): 1431-1454, September 2021. Authors contributed equally.
5. **B. B. Risk**, R. J. Murden, J. Wu, M. B. Nebel, A. Venkataraman, Z. Zhang, D. Qiu. Which multiband factor should you choose for your resting-state fMRI study? *NeuroImage* 234: 117965, 2021.
6. M. Cole, K. Murray, E. St-Onge, **B. Risk**, J. Zhong, G. Schifitto, M. Descoteaux, Z. Zhang. Surface-based connectivity integration: An atlas-free approach to joint study functional and structural connectivity. *Human Brain Mapping*, 42(11): 3481-3499, 2021.
7. S. Kundu and **B. B. Risk**. Scalable Bayesian Matrix Normal Graphical Models for Brain Functional Networks. *Biometrics*, 77(2): 439-450, 2021.
8. **B. B. Risk** and Hongtu Zhu. ACE of Space: Estimating genetic components of high-dimensional imaging data. *Biostatistics*, 22(1): 131-147, 2021.
9. D. Sung, **B. B. Risk**, M. Owusu-Ansah, X. Zhong, H. Mao, C. C. Fleischer. Optimized truncation to integrate multi-channel MRS data using rank-R singular value decomposition. *NMR in Biomedicine*, 33 (7), e4297, 2020.
10. Z. Jin, **B. B. Risk**, and D. S. Matteson. Optimization and testing in linear non-Gaussian component analysis. *Statistical Analysis and Data Mining*, March 1, 2019.
11. **B. B. Risk**, D. S. Matteson, and D. Ruppert. Linear non-Gaussian component analysis via maximum likelihood. *Journal of the American Statistical Association*. 114(525): 332-343, 2019.
12. **B. B. Risk**, M. Kociuba, and D. Rowe. Impacts of simultaneous multislice acquisition on sensitivity and specificity in fMRI. *NeuroImage*. 172: 538-553, 2018.
13. Q. Yu, **B. B. Risk**, K. Zhang, J. S. Marron. JIVE integration of imaging and behavioral data. *NeuroImage*. 152: 38-49, 2017.
14. **B. B. Risk**, D. S. Matteson, R. N. Spreng, and D. Ruppert. Spatiotemporal mixed modeling of multi-subject task fMRI via method of moments. *NeuroImage*. 142: 280-292, 2016.
15. **B. B. Risk**, D. S. Matteson, D. Ruppert, A. Eloyan, and B. S. Caffo. An evaluation of independent component analyses with an application to resting state fMRI. *Biometrics*. 70(1):224-236, 2014.
16. **B. B. Risk**, P. de Valpine, and S. R. Beissinger. A robust-design formulation of the incidence function model of metapopulation dynamics applied to two species of rails. *Ecology*. 92(2):462-474, 2011.

Collaborative

17. C. Block, M. Patel M, **B. Risk**, E. Staikova, D. Loring, C. Esper, L. Scorr, L. Higginbotham, P. Aia, M. DeLong, T. Wichmann, S. Factor, N. Au-Yong, J. Willie, N. Boulis, R. Gross, C. Buetefisch, S. Miocinovich. Patients with moderate cognitive impairment in Parkinson's disease benefit from deep brain stimulation surgery: A case-control study. *Mov Disord Clin Prac*. In press.
18. K. Wang, D. Sung, **B. Risk**, J. Allen, C. Fleischer. Effects of orientation-dependent susceptibility on MR chemical shift brain thermometry. *Magnetic Resonance Imaging*. 95: 59-62. January 2023.

19. D. Sung, **B. Risk**, P. Kottke, J. Allen, F. Nahab, A. Fedorov, C. Fleischer. Comparisons of healthy human brain temperature predicted from biophysical modeling and measured with whole brain MR thermometry. *Scientific Reports*. 12(1):19285. November 11, 2022.
20. S. Beissinger, S. Peterson, L. A. Hall, N. Van Schmidt, J. Tecklin, **B. B. Risk**, O. M. Richmond, T.J. Kovach, A. M. Kilpatrick. Stability of patch-turnover relationships under equilibrium and nonequilibrium metapopulation dynamics driven by biogeography. *Ecology Letters*. 25(11): 2372-2383. November 2022.
21. D. Sung, **B. B. Risk**, K. J. Wang, J. W. Allen, C. C. Fleischer. Resting-state brain temperature: Dynamic fluctuations in brain temperature and the brain-body temperature gradient. *Journal of Magnetic Resonance in Imaging*. July 29, 2022.
22. J. Wu, S. S. Shahid, Q. Lin, A. Hone-Blanchet, J. L. Smith, B. B. Risk, A. S. Bisht, D. W. Loring, F. C. Goldstein, A. I. Levey, J. J. Lah, D. Qiu. Multimodal magnetic resonance imaging reveals distinct sensitivity of hippocampal subfields in asymptomatic stage of Alzheimer's disease. *Frontiers in Aging Neuroscience*. 14:901140. August 12, 2022.
23. J. E. Hurtado, L. Heusel-Gillig, **B. B. Risk**, A. Trofimova, S. A. Abidi, J. W. Allen, R. K. Gore. Technology-enhanced visual desensitization home exercise program for post-concussive visually induced dizziness: a case series. *Physiotherapy Theory and Practice*. 38(8): 985-994. 2022.
24. L. Webster, J. Newsome, M. Guo, S. Lee, B. S. Majdalany, J. Gichoya, M. Platner, K. Garcia-Reyes, R. Duszak Jr., Y. Liu, **B. B. Risk**, C. A. Cwiak, N. Kokabi. Utilization and Comparative Effectiveness of Uterine Artery Embolization versus Hysterectomy for Severe Postpartum Hemorrhage: A National Inpatient Sample Study. *Journal of Vascular and Interventional Radiology*. 33(4): 427-435. April 2022.
25. C. E. Park, R. E. Sayed, **B. B. Risk**, D. C. Haussen, R. G. Nogueira, J. N. Oshinski, J. W. Allen. Carotid webs produce greater hemodynamic disturbances than atherosclerotic disease: a DSA time-density curve study. *Journal of NeuroInterventional Surgery*. 14(7): 729-733. July 2022.
26. M. E. Cooper, **B. Risk**, A. Corey, A. J. Fountain, J. W. Allen. Statistical learning of blunt cerebrovascular injury risk factors using the elastic net. *Emergency radiology*. 28: 929-937. 2021.
27. S. Tigges, E. Krupinski, U. Luhanga, D. Schulman, and **B. Risk**. Graphic narrative versus journal article for teaching medical students about P values: a randomized trial. *Journal of the American College of Radiology*. 18(8): 1176-1178. 2021.
28. K. Shinn, S. Gilyard, A. Chahine, S. Fan, **B. Risk**, T. Hanna, J. Johnson, C. Hawkins, M. Xing, R. Duszak, J. Newsome, N. Kokabi. Contemporary management of pediatric blunt splenic trauma: a National Trauma Databank Analysis. *Journal of Vascular and Interventional Radiology*. 32(5): 692-702. 2021.
29. A. H. Chahine, S. Gilyard, T. N. Hanna, S. Fan, **B. Risk**, J. O. Johnson, R. Duszak Jr., J. Newsome, M. Xing, N. Kokabi. Management of Splenic Trauma in Contemporary Clinical Practice: A National Trauma Data Bank Study. *Academic Radiology*. 28(S1): S138-S147. November 2021.

30. D. Sung, P. A. Kottke, **B. B. Risk**, J. W. Allen, F. Nahab, A. G. Federov, C. C. Fleischer. Personalized predictions and non-invasive imaging of human brain temperature. *Communications Physics*, 4(68), 2021.
31. D. Capone, P. Chigwechokha, F. de los Reyes, R. Holm, **B. B. Risk**, E. Tilley, J. Brown. Impact of sampling depth on pathogen detection in pit latrines. *PLoS neglected tropical diseases*, 15(3), 2021.
32. D. Hsu, T. Rath, B. Branstetter, Y. Anzai, C. Phillips, A. Juliano, K. Mosier, M. Bazylewicz, S. Poliashenko, M. Kulzer, P. Rhyner, **B. Risk**, R. Wiggins, A. Aiken. Interrater reliability of NI-RADS on post-treatment PET/Contrast-enhanced CT scans in head and neck squamous cell carcinoma. *Radiology: Imaging Cancer*, 3(3), 2021.
33. D. Capone, D. Berendes, O. Cumming, J. Knee, R. Nala, **B. B. Risk**, C. Stauber, K. Zhu, and J. Brown. Analysis of fecal sludges reveals common enteric pathogens in urban Maputo, Mozambique. *Environmental Science & Technology Letters*, 7(12): 889-895, 2020.
34. S. Ekici, **B. B. Risk**, S.G. Neill, H. Shu, and C.C. Fleischer. Characterization of dysregulated glutamine metabolism in human glioma tissue with ^1H NMR. *Scientific Reports*, 10, 20435, 2020.
35. M. C. Schechter, M. K. Ali, **B. B. Risk**, A. D. Singer, G. Santamarina, H. K. Rogers, R. R. Rajani, G. Umpierrez, M. Fayfman, and R. R. Kempkar. Percutaneous bone biopsy for diabetic foot osteomyelitis: a systematic review and meta-analysis. *Open forum infectious diseases*, 7(10):ofaa393, 2020.
36. M. Braileanu, **B. B. Risk**, N. Kadom, M. E. Mullins, E. A. Krupinski, A. M. Saindane, and B. D. Weinberg. Structured Curriculum Vitae scoring as a standardized tool for selecting interview candidates for academic neuroradiology faculty positions. *Current Problems in Diagnostic Radiology*, 49(6), 377-381, 2020.
37. K. D. Herr, **B. Risk**, and T. N. Hanna. Diagnostic radiology resident perspectives on fellowship training and career interest in emergency radiology. *Emergency Radiology* 25(6), 653-658, 2018.
38. S. A. Kaiser, **B. B. Risk**, T. S. Sillett, and M. S. Webster. Ecological and social factors constrain spatial and temporal opportunities for mating in a migratory songbird. *American Naturalist*. 189(3): 283-296, 2017.
39. F. Mestre, **B. B. Risk**, R. Pita, A. Mira, and P. Beja. A metapopulation approach to predict species range shifts under different climate change and landscape connectivity scenarios. *Ecological Modelling*. 359: 406-414, 2017.
40. S. A. Kaiser, T. S. Sillett, **B. B. Risk**, and M. S. Webster. Experimental food supplementation reveals habitat-dependent male reproductive investment in a migratory bird. *Proceedings of the Royal Society B: Biological Sciences*. 282(1803), 2015.
41. O. M. Richmond, S. Chen, **B. B. Risk**, J. Tecklin, and S. R. Beissinger. California Black Rails depend on irrigation-fed palustrine emergent wetlands in the Sierra Nevada Foothills. *California Agriculture*. 64(2):85-93, 2010.

Letters and commentary

42. **B. B. Risk** and D. Qiu. On the reproducibility of quantitative susceptibility mapping and its potential as a clinical biomarker: A comment on Cogswell et al. *Neuroimage*. 245:118646. December 15, 2021.

43. **B. B. Risk** and H. Zhu. Note on bias from averaging repeated measurements in heritability studies. *Proceedings of the National Academy of Sciences*. 115(2): E122, 2018.
44. **B. B. Risk**. Book Review of “A Handbook of Neuroimaging Statistics.” *Journal of the American Statistical Association*, 113:521, 480-485, 2018.

INVITED
PRESENTATIONS

1. **B. B. Risk**. Unsupervised learning in data integration studies using JIVE with Gaussian mixtures. *2022 International Symposium on Modern Data Science Application, Practice, and Theory*, New Haven, CT. November 19-20, 2022.
2. **B. B. Risk**, G. Tian, J. Lah, and J. Hanfelt. Clustering Using JIVE with Gaussian Mixtures for Data Integration. *JSM 2022*, Washington DC, August 6-11, 2022.
3. **B. B. Risk**. Correcting Sampling Bias in Neuroimaging Studies using Doubly Robust Nonparametric Inference. *ICSA Canada Chapter 2022 Symposium Statistics: From Data to Knowledge*. Banff, Alberta, Canada. July 8-10, 2022.
4. **B. B. Risk**. Probabilistic joint and individual variation explained. *EcoSta 2022*. Ryukoku University, Kyoto, Japan. June 4-6, 2022.
5. **B. B. Risk**. A missing data method for deconfounding in neuroimaging studies. *ENAR 2022 Spring Meeting*, Houston, TX. March 27-30, 2022.
6. **B. B. Risk**. Data integration in neuroimaging studies. Brain Space Initiative, as part of the activities of the BSISubspace Section, co-sponsored by the Center for Translational Research in Neuroimaging and Data Science (TReNDS) and the Data Science Initiative, IEEE Signal Processing Society. 10 November 2021.
7. **B. B. Risk**. Data integration in neuroimaging studies. Department of Biostatistics and Health Data Sciences, Indiana University School of Medicine. 5 November 2021.
8. **B. B. Risk**. A missing data method for deconfounding in neuroimaging studies. *Georgia Statistics Day*, Emory University, Atlanta, GA. 11 October 2021.
9. **B. B. Risk**. Statistical considerations for multiband resting-state fMRI studies. The ASA Statistics in Imaging Section. Invited presentation (Webinar). April 16, 2021.
10. **B. B. Risk** and I. Gaynanova. Simultaneous Non-Gaussian component analysis (SING) for data integration in neuroimaging. *ENAR 2021 Spring Meeting*, March 14–17, 2021.
11. **B. B. Risk** and H. Zhu. Heritability models for neuroimaging. *JSM 2020*, August 2–6, 2020.
12. **B. B. Risk**. Which multiband factor should you choose for your resting-state fMRI study? PennSIVE (Penn Statistics in Imaging and Visualization Endeavor) Seminar, Perelman School of Medicine, University of Pennsylvania, Philadelphia, Pennsylvania, March 3, 2020.
13. **B. B. Risk** and S. Kundu. Scalable Bayesian Matrix Normal Graphical Models for Brain Functional Networks. *CMStatistics 2019*, University of London, London, UK, December 14–16, 2019.

14. **B. B. Risk** and I. Gaynanova. Joint and Individual Non-Gaussian Component Analysis for Data Integration. *2019 ICSA Applied Statistics Symposium*, Raleigh, NC, June 9–12, 2019.
15. **B. B. Risk**. Data Integration via Joint and Individual Non-Gaussian Component Analysis. Department of Mathematics, Statistics, and Computer Science Colloquium, Marquette University, WI, March 21, 2019.
16. **B. B. Risk** and I. Gaynanova. Joint and Individual Non-Gaussian Component Analysis. *CMStatistics*, Pisa, Italy, December 14–16, 2018.
17. **B. B. Risk**. Dimension Reduction, Non-Gaussian Component Analysis, and Data Integration. Department of Biostatistics Colloquium, University of Rochester, NY, November 29, 2018.
18. **B. B. Risk**, M. Kociuba, and D. Rowe. Statistical impacts of reconstruction method in simultaneous multislice acquisition of MRI. *Statistical Methods in Imaging Conference*, University of Pennsylvania, Philadelphia, PA, June 6–8, 2018.
19. **B. B. Risk**. Scalable Estimation for Genetic Components of High-Dimensional Imaging Data. *NOGGINS (Network of Greater Georgia Institutions for Neuroimaging and Statistics) 2018*, University of Georgia, April 13, 2018.
20. **B. B. Risk**. Statistical impacts of simultaneous multislice imaging and implications for experimental design in fMRI. Statistics Department Colloquium, Indiana University, Bloomington. November 13, 2017.
21. Qunqun Yu, **B. B. Risk***, Kai Zhang, and J. S. Marron. *Presenting author. JIVE integration of behavioral and fMRI data. *JSM 2017*, Baltimore, Maryland, July 29 – August 3, 2017.
22. **B. B. Risk**, M. Kociuba, and D. Rowe. Impacts of multiband acceleration factors on sensitivity and specificity. *23rd Annual Meeting of the Organization for Human Brain Mapping*, Vancouver, Canada, June 25–29, 2017.
23. **B. B. Risk** and H. Zhu. Genetic covariance functions and heritability in neuroimaging with an application to cortical thickness analysis. *Statistical Methods in Imaging Conference*, Pittsburgh, PA, May 31–June 2, 2017.
24. **B. B. Risk**, D. S. Matteson, and D. Ruppert. Likelihood-based non-Gaussian and Gaussian component analysis. *CMStatistics*, Seville, Spain, December 9–11, 2016.
25. **B. B. Risk**. Modeling dependence in neuroimaging data. Functional Data Seminar, North Carolina State University, September 29, 2016.
26. **B. B. Risk**. Likelihood component analysis. Statistics Department Colloquium, Texas A&M University. September 16, 2016.
27. **B. B. Risk**, D. S. Matteson, R. N. Spreng, and D. Ruppert. Spatiotemporal mixed modeling of multi-subject task fMRI via method of moments. *IISA 2016*, Corvallis, OR, U.S.A., August 18–21, 2016.
28. **B. B. Risk** and D. B. Rowe. Examination of artifacts from multiband imaging. *SAMSI CCNS Transitions Workshop*, Research Triangle Park, NC, U.S.A., May 4–6, 2016.
29. **B. B. Risk**, D. S. Matteson, R. N. Spreng, and D. Ruppert. Spatiotemporal mixed modeling of multi-subject task fMRI. *ENAR Spring Meeting 2016*, Austin, TX, U.S.A., March 6–9, 2016.

TOPIC
CONTRIBUTED
PRESENTATIONS

1. **B. B. Risk** and I. Gaynanova. Data integration using joint and individual non-Gaussian component analysis. *JSM 2019*, Denver, Colorado, July 27–August 1, 2019. Topic contributed session.
2. **B. B. Risk**, M. Kociuba, and D. Rowe. Impacts of multiband acceleration factors on sensitivity and specificity. *JSM 2018*, Vancouver, Canada, July 28–August 2, 2018. Topic contributed session.
3. **B. B. Risk**, D. S. Matteson, R. N. Spreng, and D. Ruppert. Spatiotemporal mixed modeling of multi-subject task fMRI via method of moments. *JSM 2016*, Chicago, IL, U.S.A., July 30–August 4, 2016. Topic contributed session.
4. **B. B. Risk**, D. S. Matteson, and D. Ruppert. Likelihood component analysis. *JSM 2015*, Seattle, WA, U.S.A., August 8–13, 2015. Topic contributed session.

CONTRIBUTED
PRESENTATIONS

1. **B. B. Risk**, D. Lidstone, L. Wang, D. Benkeser, M. Nebel. Doubly robust targeted minimum loss-based estimation to address sampling bias in functional connectivity studies. *JSM 2021*, virtual, August 8-12, 2021.
2. **B. B. Risk** and H. Zhu. Large covariance estimation for spatial functional data with an application to twin studies. *Mathematical and Statistical Challenges in Neuroimaging Data Analysis*, Banff International Research Station, Alberta, CA, January 31–February 5, 2016.
3. **B. B. Risk**, D. S. Matteson, and D. Ruppert. Unsupervised dimension reduction via maximization of a non-Gaussian likelihood. *JSM 2014*, Boston, MA, U.S.A., August 2–7, 2014.
4. **B. B. Risk**, D. S. Matteson, and D. Ruppert. An evaluation of independent component analysis with an application to resting-state fMRI. *JSM 2013*, Montreal, Quebec, CA, August 3–8, 2013.
5. **B. B. Risk**. Spatial and temporal variation in the hydrology of restored wetlands: Impacts on migrating waterbirds along the South Platte River. *Wildlife & Conservation Biology Seminar Series*, University of California Berkeley. Berkeley, CA, U.S.A., September 19, 2008.
6. **B. B. Risk** and S. R. Beissinger. Predicting the effects of habitat destruction on a metapopulation of the California Black Rail in the Sierra Foothills. *American Ornithologists Union, Cooper Ornithological Society, and Society of Canadian Ornithologists 2008 Meeting*, Portland, OR, U.S.A. August 4–9, 2008.
7. **B. B. Risk** and S. R. Beissinger. Assessing the impacts of habitat loss and degradation on a metapopulation of the California Black Rail. *Bay Area Conservation Biology Symposium*, Davis, CA, February 2, 2008.

PANEL
DISCUSSIONS

1. A. Fang (Data Scientist, Google) and **B. B. Risk**. NISS Affiliate Graduate Student Networking Event: Meeting with Alumni. November 19, 2020. Virtual meeting discussing academic and industry careers.

SELECTED
POSTERS

1. **B. B. Risk**, Junjie Wu, and Deqiang Qiu. 3942. Which multiband factor should you choose for your resting-state study? *ISMRM 2019*, Montreal, QC, Canada, May 11–16, 2019.
2. **B. B. Risk**, Yuxuan Zhao, M. B. Nebel, D. S. Matteson. Group and Individual Non-Gaussian Component Analysis for Multi-Subject fMRI. *ENAR 2019 Spring Meeting*. Philadelphia, PA, March 24–27, 2019. (Invited Speed Poster.)
3. Mingrui Liang and **B. B. Risk***. *Presenting author. Time series modeling in high resolution fMRI. *Forecasting from Complexity*, Institute for Mathematics and its Applications, Minneapolis, MN, April 23–27, 2018.
4. Qunqun Yu, **B. B. Risk***, Kai Zhang, and J. S. Marron. *Presenting author. JIVE integration of behavioral and fMRI data. *19th Meeting of New Researchers in Statistics and Probability (NRC 2017)*, Baltimore, Maryland, July 27 - July 29, 2017.
5. B. Langworthy, **B. B. Risk**, K. Sellers, B. Vaughn, J. Gilmore, H. Zhu, and F. Frohlich. The effect of transcranial alternating current stimulation on alpha and gamma oscillations. *2016 Triangle Imaging Symposium*, Chapel Hill, North Carolina, March 23, 2016.
6. **B. B. Risk**, D. S. Matteson, and D. Ruppert. Comparing independent component analysis estimation methods with an application to neuroimaging of resting state functional connectivity in attention deficit and hyperactivity disorder. *ENAR Spring Meeting 2012*, Washington, D.C., April 1–4, 2012. Poster abstract.

RESEARCH
SUPPORT

Ongoing

1. Title: Statistical approaches to improving functional connectivity estimates with an application to autism
Major Goals: The goal of this study is to propose a model for brain dynamics during a task to conduct a reproducibility study to learn how the brain functions in autism spectrum disorder and develop tools that can be used by other research groups to improve our understanding of brain disorders.
Status of Support: Active
Project Number: 1R01MH1298555-01
Name of PD/PI: **Risk, Benjamin**
Source of Support: NIH/ NIMH
Primary Place of Performance: Atlanta, Georgia, USA
Project/Proposal Start and End Date: (MM/YYYY) (if available): 04/01/2022-03/31/2027
Total Award Amount (including Indirect Costs): \$3,643,429
Effort: 20%
2. Title: Advancing Methods for Structural Connectome Acquisition and Estimation in Older Adults
Major Goals: We aim to understand how accelerated imaging impacts MRI data analysis in subjects at-risk of Alzheimer’s disease (AD).
Status of Support: Active with NCE
Project Number: 1R21AG066970-01

- Name of PD/PI: **Risk, Benjamin** (MPI) and Zhang, Zhengwu
Source of Support: NIH/NIA (sub from Univ. of Rochester)
Primary Place of Performance: Atlanta, Georgia, USA
Project/Proposal Start and End Date: (MM/YYYY) (if available): 01/2021-04/2022 (NCE)
Total Award Amount (including Indirect Costs): \$97,537.50
Effort: 10%
3. Title: Morris K. Udall Centers of Excellence for Parkinson's Disease Research at Emory University
Major Goals: The Morris K. Udall Parkinson's Disease Center of Excellence for Parkinson's Disease Research at Emory University is a collaborative research program that studies the pathophysiology of parkinsonism with the goal of optimizing the treatment for Parkinson's disease (PD).
Status of Support: Active
Project Number: 1P50NS123103-01
Name of PD/PI: Wichmann, Thomas
Source of Support: NIH/NINDS
Primary Place of Performance: Atlanta, Georgia, USA
Project/Proposal Start and End Date: (MM/YYYY) (if available): 09/2021-07/2026
Total Award Amount (including Indirect Costs): \$11,764,445
Effort: 20%
4. Title: Psychosis-related Physiological and Neuronal Phenotypes in 22q11 Deletion Syndrome
Major Goals: This project will generate new knowledge regarding a genetic condition called 22q11.2 deletion syndrome that carries a very high-risk developing schizophrenia in affected individuals.
Status of Support: Active
Project Number: 5R01MH117315-03
Name of PD/PI: Cubells, Joseph Faustino
Source of Support: NIH/NIMH
Primary Place of Performance: Georgia, USA
Project/Proposal Start and End Date: (MM/YYYY) (if available): 09/2019-07/2024
Total Award Amount (including Indirect Costs): \$3,378,419.00
Proposal Effort: 10% (effort reduced to maintain total effort \leq 100%)
5. Title: Development of Fast Penumbra Imaging in Acute Ischemic Stroke
Major Goals: We will develop robust fast pH and DKI stroke imaging (Aim 1), establish the spatiotemporal evolution of the refined MRI in MCAO rats (Aim 2), and test tissue-clock-guided reperfusion in rats of common stroke comorbidities of age and diabetes (Aim 3).
Status of Support: Active
Project Number: 5R01NS083654-08

- Name of PD/PI: Sun, Zhe
Source of Support: NIH/NINDS
Primary Place of Performance: Atlanta, Georgia, USA
Project/Proposal Start and End Date: (MM/YYYY) (if available): 07/2020-05/2025
Total Award Amount (including Indirect Costs): \$2,079,049.00
Proposal Effort: 8% (effort reduced to maintain total effort \leq 100%)
6. Title: High-sensitivity Immunomagnetic System for “Liquid Biopsy” of Alzheimer’s Disease
Major Goals: The project proposes to develop a highly sensitive immune-magnetic technology for detection and quantification of Alzheimer’s disease (AD) biomarkers, i.e. amyloid- β peptides (A β s) and microtubule tau proteins, in cerebrospinal fluid or even blood samples.
Status of Support: Active
Project Number: 1R01AG067736-01A1
Name of PD/PI: Mao, Hui
Source of Support: NIH/NIA
Primary Place of Performance: Georgia, USA
Project/Proposal Start and End Date: (MM/YYYY) (if available): 02/2021-12/2025
Total Award Amount (including Indirect Costs): \$2,935,120.00
Proposal Effort: 8% (effort reduced to maintain total effort \leq 100%)
7. Title: Improved non-invasive MR brain thermometry for therapeutic hypothermia
Major Goals: Our goal is to develop a new method for non-invasive brain temperature monitoring and to demonstrate the ability to measure brain-body temperature differences in cardiac arrest patients during cooling.
Status of Support: Active
Project Number: 1R21EB029622-01A1
Name of PD/PI: Fleischer, Candace C
Source of Support: NIH/NIBIB
Primary Place of Performance: Atlanta, Georgia, USA
Project/Proposal Start and End Date: (MM/YYYY) (if available): 04/2021-12/2023
Total Award Amount (including Indirect Costs): \$624,000.00
Effort: 5%
8. Title: Cortical Pathophysiology of Parkinsonism
Major Goals: The consortium will develop and utilize cortical imaging and other techniques in monkeys and other species to study synchronized multi-neuron activities in the motor cortices in progressive parkinsonism.
Status of Support: Active
Project Number: ASAP-020572
Name of PD/PI: Wichmann, Thomas
Source of Support: Michael J Fox FDTN for Parkinson’s Research

- Primary Place of Performance: Atlanta, Georgia, USA
Project/Proposal Start and End Date: (MM/YYYY) (if available): 10/2021-09/2024
Total Award Amount (including Indirect Costs): \$6,360,536.00
Effort: 10%
9. Title: A novel framework for quantifying metabolic brain health
Major Goals: This proposal aligns with the New Innovator Program as it describes a cross-disciplinary and cross-institute approach to develop the field of metaboloradiomics.
Status of Support: Active
Project Number: 1DP2NS127704-01
Name of PD/PI: Fleischer, Candace C
Source of Support: NIH/NINDS
Primary Place of Performance: Atlanta, Georgia, USA
Project/Proposal Start and End Date: (MM/YYYY) (if available): 09/2021-08/2024
Total Award Amount (including Indirect Costs): \$1,408,500.00
Proposed Effort: 10% (effort reduced to maintain total effort \leq 10%)
10. Title: Altered Central Multisensory Processing in Post-concussion Vestibular Dysfunction
Major Goals: The proposed study will fill a significant knowledge gap and advance our understanding of post-concussive vestibular dysfunction and visual vestibular multisensory processing and dysfunction, as well as define endophenotypes of patients with post-concussion vestibular dysfunction based on clinical and neuroimaging metrics that predict response to vestibular rehabilitation therapy.
Status of Support: Active
Project Number: 1R01NS119683-01A1
Name of PD/PI: J. Allen
Source of Support: NIH/ NINDS
Primary Place of Performance: Atlanta, Georgia, USA
Project/Proposal Start and End Date: (MM/YYYY) (if available): 01/01/2022-12/31/2026
Total Award Amount (including Indirect Costs): \$1,992,982
Person Months (Calendar/Academic/Summer) per budget period. Year (YYYY)
Effort: 15%
11. Title: Cerebral hemodynamic impairment in symptomatic and asymptomatic Alzheimers Disease
Major Goals: The overarching goal of the proposed project is to study whether Alzheimer's Disease (AD) pathology directly interacts with cerebrovascular pathology in the early phases of the AD continuum, as well as the relative contributions of cerebrovascular and AD pathologies to cognitive impairments in early AD
Status of Support: Active
Project Number: 1R01AG072603-01
Name of PD/PI: D. Qiu

Source of Support: NIH

Primary Place of Performance: Atlanta, Georgia, USA

Project/Proposal Start and End Date: (MM/YYYY) (if available): 02/01/2022-01/31/2027

Total Award Amount (including Indirect Costs): \$3,951,868

Person Months (Calendar/Academic/Summer) per budget period. Effort: 10%

12. Title: Optimizing patient-specific deep brain stimulation models using electrophysiology

Major Goals: Deep brain stimulation (DBS) is used for treatment of Parkinson's disease and many neuropsychiatric disorders. Researchers and clinicians have used 3-dimensional computer models of patient brains (based on their MRI) to predict how far stimulation effects spread around DBS electrode with the goal of understanding which brain areas are important in DBS and to improve DBS programming. We plan to test the accuracy of different DBS models variants by comparing their predictions of neural activations to experimental evoked potential measurements and to clinical side effects in patients with Parkinson's disease.

Status of Support: Active

Project Number: 1R01NS125143-01

Name of PD/PI: Miocinovic, Svjetlana

Source of Support: NIH/ NINDS

Primary Place of Performance: Atlanta, Georgia, USA

Project/Proposal Start and End Date: (MM/YYYY) (if available): 01/2022-12/2026

Total Award Amount (including Indirect Costs): \$3,171,691.00

Effort: 5%

Completed

1. Title: Prognostic Imaging and Blood Markers of Wound Healing Among Patients with Diabetic Foot Ulcers.
Status of Support: Completed
Name of PD/PI: David Reiter
Source of Support: Augusta University/ Diabetic Complications Consortium (NIDDK).
Project/Proposal Start and End Date: 2019-2020.
Effort: 1% in kind.
2. Title: Improving estimates of functional connectivity in the human brain.
Status of Support: Completed
Name of PD/PI: **Risk, Benjamin**
Source of Support: Emory University Rollins School of Public Health Pilot Grants Awards.
Project/Proposal Start and End Date: 2019-2020.
Effort: 1% in kind.

- Title: Computational models for biomarker and risk predictions in Alzheimer’s Disease.

Status of Support: Completed

Name of PD/PI: Qiu, Deqiang, Co-PI: **Risk, Benjamin**

Source of Support: Alzheimer’s Disease Research Center at Emory University. Pilot study subaward of P50AG025688.

Project/Proposal Start and End Date: 2019-2020.

Effort: 1% in kind.

HONORS AND AWARDS

- Distinguished Teaching Award, Department of Biostatistics and Bioinformatics, Emory University, 2021.
- Runner-up in the student paper competition, Imaging Section of the American Statistical Association, JSM 2016.
- Presidential Scholar, Dartmouth College, 2003.
- Phi Beta Kappa, Member, 2002.

SOFTWARE



Software available at github.com/thebrisklab.

1. L. Wang, I. Gaynanova, and **B. B. Risk**. singR: An R package for Simultaneous Non-Gaussian component analysis. CRAN.R-project.org/package=singR.
2. **B. B. Risk** and Hongtu Zhu. Code supporting “ACE of space: estimating genetic components of high-dimensional imaging data.” github.com/BenjaminRisk/SpatialACE.
3. **B. B. Risk**, D. S. Matteson, and D. R. Ruppert. Code supporting “Linear Non-Gaussian Component Analysis via Maximum Likelihood.” github.com/BenjaminRisk/LNGCA.
4. **B. B. Risk**, N. A. James, and D. S. Matteson. steadyICA: An R-package for independent component analysis and multivariate tests of independence using distance covariance. cran.r-project.org/web/packages/steadyICA/
5. F. Mestre, F. Canovas, **B. Risk**, R. Pita, A. Mira, and P. Beja. MetaLandSim: An R-package for landscape and range expansion simulation. cran.r-project.org/web/packages/MetaLandSim/
6. **B. B. Risk**. Code supporting “Spatiotemporal mixed modeling of multi-subject task fMRI via method of moments.” github.com/BenjaminRisk/stmm

7. **B. B. Risk.** Code supporting “An evaluation of independent component analyses with an application to resting state fMRI.”
<http://onlinelibrary.wiley.com/doi/10.1111/biom.12111/full>.
8. **B. B. Risk.** Code supporting “A robust-design formulation of the incidence function model of metapopulation dynamics applied to two species of rails.”
www.esapubs.org/archive/ecol/E092/040/.

MENTORING

PhD Students Supervised

1. Ganzhong (Gavin) Tian. (Completed: Summer 2022). Probabilistic clustering of complex biomarker data for Alzheimer’s Disease. Position after graduation: Analyst for Amazon.
2. Raphiel Murden. (Completed: Summer 2021). Topics in Data Integration Methods for Neuroimaging and Generalized Additive Mixed Models for Ambulatory Blood Pressure Curves and Psychosocial Stressors. Position after graduation: Assistant Professor in the Department of Biostatistics and Bioinformatics, Emory University.

PhD Student Committees

1. Sohail Nizam (current)
2. Zeena Ammar (Neuroscience) (current)
3. Samuel Aiyedipe (Completed: Spring 2022)
4. Yikai Wang (Completed: Spring 2020)

Master’s Students Supervised

1. Liangkang Wang (Expected Spring 2023).
2. Sijian Fan. (Completed: Spring 2020). Improved Algorithm for Independent Component Analysis (ICA) with Relax and Split Approximation. Position after graduation: PhD student in the Department of Statistics at the University of South Carolina.
3. Lingyi Peng. (Completed: Spring 2020). Variable Selection of Neuroimaging Features in Mild Cognitive Impairment. Position after graduation: PhD student in the Department of Biostatistics at the University of Pittsburgh.
4. Liwei Wang. (Completed: Spring 2020). The impact of quality control exclusion criteria on functional connectivity in children with neurodevelopmental disorders. Position after graduation: Statistical programmer in Shanghai, China.
5. Zixi Yang. (Completed: Spring 2019). The impact of initialization in optimization of independent components in functional magnetic resonance imaging. Positions after graduation: PhD student in the Department of Biostatistics and Data Science at UT Health, the University of Texas.
6. Mingrui Liang. (Completed: Spring 2018). An exploration of time series models and their application to functional magnetic resonance imaging. Currently a PhD student in the Department of Statistics at Rice University.

Master’s Students Reader

1. Praveen Suthaharan. (Completed: Spring 2019). Thesis title: A Bayesian Latent Scale Brain Network Approach to Conceptualize Post-Traumatic Stress Disorder. Poster award winner at Emory Biostatistics Poster Symposium. Role: Reader.
2. Xinyi Yang. (Completed: Spring 2019). Thesis title: A Novel Network Connectivity Measure with Application to Multimodal Brain Imaging Study. Role: Reader.

Visiting Doctoral Students

1. Yuxuan Zhao (Department of Statistics and Data Science, Cornell University)
2. Mingrui Liang (Department of Statistics, Rice University)

TEACHING

Emory University

Instructor

- BIOS 526. Modern Regression Analysis (45 students Fall 2018, 48 Fall 2019, 32 Fall 2020, 20 Fall 2021, 26 for Fall 2022). 3 credits.
- BIOS 780R. Research Methods in Biostatistics (5 in Spring 2018, 7 Spring 2019, 8 Spring 2020, 7 Spring 2021, 10 Spring 2022). 1 credit.
- BIOS 590/790. Seminar in Biostatistics (102 in 590 and 14 in 790 Spring 2019, 99 and 16 Spring 2020, co-instructor with 76 and 21 in Fall 2021). 1 credit.
- Guest lecturer / lab organizer for Emory Summer Institute in Biostatistics, Summer 2019. (1 day.)
- Guest lecturer in BIOS 516: Introduction to Large-Scale Biomedical Data Analysis (Fall 2019, Fall 2021). (1 2-hr lecture.)
- Guest lecturer in BIOS 760: Special Topics: Neuroimaging Statistics (Spring 2020). (1 2-hr lecture.)

PROFESSIONAL SERVICE

National/International

1. Leadership roles and committees:

- Program Chair (2023) and Program Chair Elect (2022), Statistics in Imaging Section. Organizer of the JSM 2022 Student Paper Award.
- Program committee, JSM 2023, Statistics in Imaging section representative.
- Program committee, ENAR 2022.
- Local organizing committee, Statistical Methods in Imaging Conference 2021.
- ENAR Regional Advisory Board, 2019-2021. Secretary: 2020-2021.
- 2016 Field of Dreams Conference, Math Alliance. *SAMSI representative and presenter*
 - The Alliance seeks to increase the number of doctoral degrees in the mathematical sciences in under-represented groups.

2. Session organizer:

- Causal Inference in Neuroimaging and Radiology. Topic Contributed Papers. *JSM 2022*, Washington, D.C.
- Advanced Imaging. *Statistics in Imaging 2021*.
- Modeling with Large Covariance Matrices: Applications in Neuroimaging. *ENAR 2021 Spring Meeting*.

- Student Paper Awards Presentations, organizer and chair. *Statistical Methods in Imaging 2020*.
 - Nonconvex optimization and biological applications. *ENAR 2019 Spring Meeting*.
 - Analysis and Processing of Complex-valued MRI. *Statistics in Imaging 2018*.
3. Session chair:
- Session 28: Non-Parametric Methods for Biomedical Data. ICSA Canada Chapter 2022 Symposium. Banff, Alberta, Canada, July 8-10, 2022.
 - Analysis of brain imaging data using shape-restricted modeling, tensor modeling and directional network modeling. *Statistical Methods in Imaging 2022*, Nashville, TN.
 - Session 83: Missing Data. ENAR 2022, Houston, TX.
 - Session 215633: Applications in Time Series Analysis. JSM 2018, Vancouver, BC, CA.
4. Service to student paper competitions:
- Organizer of the JSM 2022 Student Paper Award for the Section on Imaging Statistics of the American Statistical Association.
 - Reviewer for Student Paper Award, *Statistical Methods in Imaging Conference 2022*.
 - Organizer of the Student Paper Award, *Statistical Methods in Imaging Conference 2020*.
 - Reviewer for the 2018 David P. Byar Award for the Biometrics Section of the American Statistical Association.

Emory University

1. Community and Diversity Committee, Rollins School of Public Health, Emory University. 2021-present.
2. Diversity, Equity, and Inclusion committee, Department of Biostatistics and Bioinformatics. Chair, 2021-present. Member, 2018-2020.
3. Awards committee. 2021-present.
4. Emory representative at the Fostering Diversity in Biostatistics Workshop, ENAR 2021.
5. Methods curriculum subcommittee, Department of Biostatistics & Bioinformatics. 2018-2020.
6. Research computing working group. Department of Biostatistics & Bioinformatics. 2017-present.
7. Computation and Data Science Advisory Group, Rollins School of Public Health. 2018-present.
8. PhD admissions committee, Department of Biostatistics and Bioinformatics. 2019, 2020.
9. Shepard Award committee for best Master's thesis in the Department of Biostatistics & Bioinformatics. 2018.

10. Qualifying exam committee. Department of Biostatistics & Bioinformatics. 2018.
11. Emory STEM Research and Career Symposium. BIOS organizer and participant. The symposium brings together students from diverse backgrounds for networking, mentoring, and recruitment. 2018.

Referee

- Annals of Applied Statistics
- Annals of Epidemiology
- Annals of Statistics
- Biometrics
- Biometrika
- Biostatistics
- Brain and Behavior
- Canadian Journal of Statistics
- Computational Statistics and Data Analysis
- Frontiers in Neuroscience
- Human Brain Mapping
- IEEE Transactions on Medical Imaging
- IEEE Transactions on Computational Biology and Bioinformatics
- International Conference on Machine Learning
- Journal of Alzheimer's Disease
- Journal of the American Statistical Association
- NeuroImage
- Scandinavian Journal of Statistics
- Statistics and Its Interface
- Statistics in Medicine

Editorial Board

- Data Science in Science

Grant Review

- Review of NSF proposal in Cognitive Neuroscience

PROFESSIONAL EXPERIENCE

- SUNY-ESF**, Pinta and Santa Cruz Islands, Galápagos, Ecuador
Field Technician **Summer 2010**
- American Journal Experts**
Contract Editor **Fall 2009 - Spring 2010**
- Bird Conservancy of the Rockies**, Fort Collins, CO
Avian Ecologist **Winter - Summer 2007**
- Conducted statistical analyses of habitat use by birds.
- Charles River Associates**, Oakland, CA
Research Associate **Winter 2004 - Summer 2006**
- Conducted statistical analyses in antitrust and energy economics.
- Resource Systems Group**, White River Junction, VT
Intern **Winter - Spring 2003**
- Smithsonian Migratory Bird Center**, Hubbard Brook, NH
Field Technician **Summer 2000 and Summer 2002**
- Cooperative Extension Unit, University of Montana**, Cosanga, Ecuador
Field Technician **Spring 2001**

PROFESSIONAL MEMBERSHIPS	American Statistical Association (ASA) Eastern North American Region of the International Biometric Society (ENAR) International Society for Magnetic Resonance in Medicine Organization for Human Brain Mapping
HOBBIES	Cycling, guitar, birdwatching, hiking.
CITIZENSHIP	U.S.A.