

**Meredith A. Ray**  
Associate Professor of Biostatistics  
Biostatistics Program Coordinator

### ***University Address***

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University of Memphis  
Robison Hall 220  
Division of Epidemiology, Biostatistics, and Environmental Health  
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Memphis, TN 38152  
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### ***Research Interest***

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Clustering, Bayesian Methods, Semi-parametric modeling, fMRI Brain Imaging Data Analysis, Bioinformatics, Lung Cancer, Sickle Cell Disease, and HIV

### ***Education***

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2010-2014	Doctorate of Philosophy in Biostatistics, Arnold School of Public Health, University of South Carolina, Columbia, SC
2007-2009	Master of Public Health in Biostatistics, College of Public Health, University of Georgia, Athens, GA
2004-2007	Bachelor of Science in Mathematics, Piedmont College, Demorest, GA

### ***Professional Experience***

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2024-present	Risk Analysis Section Council of Sections Representative (ASA)
2024-present	UofM ACRE Affiliate Faculty
2023-present	Biostatistics Program Coordinator, University of Memphis, Memphis, TN
2020-present	Associate Professor in Biostatistics, University of Memphis, Memphis, TN
2015-2020	Assistant Professor in Biostatistics, University of Memphis, Memphis, TN
2014-present	Statistical Consultant
2013-2015	Research Assistant, University of Memphis, Memphis, TN
2010-2013	Research Assistant, University of South Carolina, Columbia, SC
2013	Student Consultant, University of South Carolina, Columbia, SC
2007-2010	Research Assistant, University of Georgia, Athens, GA
2009	Assistant Consultant, Ted Simon LLC, Independent Consultant, Atlanta, GA

### ***Research Support***

#### **Grants funded:**

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CoRS 2024	(PI: Yu Jiang)	10/2024-06/2025
Title: Development of Integrated Platforms for AI-Assisted Asthma Prediction and Asthma Mechanistic Studies		
Source: University of Memphis		
Amount: \$2,500		

**Role and % effort: Co-investigator (0%)**

NU58DD000035-01-00 (PI: Matthew Smeltzer) 09/2023-09/2025  
Title: Tennessee Sickle Cell Disease Surveillance Program  
Source: CDC  
Amount: \$476,610  
**Role and % effort: Co-investigator (20% AY/20% SY)**

LITE-2 (MPI: Christian Grov and Adam Carrico) 03/2022 – 02/2027  
Title: Optimizing HIV prevention for highly vulnerable methamphetamine-using sexual minority men  
Source: NIH/NIAAA  
**Role and effort: Co-investigator (4% AY/10% SY)**

TDoH/CDC (PI: Marian Levy) 08/2022-06/2024  
Title: TRAIN Learning Management System: UofM School of Public Health curriculum development  
Source: Centers for Disease Control (CDC)/Tennessee Department of Health (TDoH)  
**Role and effort: Co-investigator (paid by module)**

5R21DC020557-02 Eichorn (PI) 7/2023 – 06/2025  
Title: Information processing biases in adults who stutter: Behavioral and eye-tracking indices of threat-related attention allocation.  
Source: NIH  
Role and % effort: Co-investigator (5%)

IASLC (MPI: Smeltzer and Ray) 3/2025-3/2029  
Title: Epidemiology and Biostatistics Data Coordinating Center for IASLC Neoadjuvant Trial Endpoint Database  
Source: IASLC  
**Role and % effort: MPI, 20%**

**Grants Completed:**

2R01CA172253-06 (PI: Raymond Osarogiagbon) 08/2018-06/2024  
Title: Improving N1 lymph node examination in a high US lung cancer mortality region  
Source: NCI/NIH  
Amount: \$499,347  
**Role and % effort: Co-investigator (10%CY)**

UTHSC Contract (PI: Meredith Ray) 05/2022-07/2022; 01/2023-05/2023  
Title: Statistical Evaluation-Agreement with UTHSC  
Source: UTHSC  
Role and effort: Principal Investigator (4%AY/10% SY)

CoRS 2021 (PI: Meredith Ray) 11/2021-5/2022  
Title: Developing a multidimensional and data-driven understanding of sexual positioning identity among cisgender men who have sex with men  
Source: University of Memphis  
Amount: \$2,500  
**Role and % effort: Principal Investigator (0%)**

CoRS 2020 (PI: Xichen Mou) 10/2019-06/2020  
 Title: Covid-19 Screening using pool testing in Memphis  
 Source: University of Memphis  
 Amount: \$2,500

**Role and % effort: Co-investigator (0%)**

American Heart Association (PI: Brandt Pence) 04/2018-03/2021  
 Title: Glycolytic Metabolism and Cellular function in Monocytes from Older Adults  
 Source: AHA  
 Amount: \$154,000

**Role and % effort: Statistician (3%CY)**

1R03AI128227-01A1 (PI: Meredith Ray) 01/2018-12/2019(2020 NCE)  
 Title: Joint Patterns of multi-genetic/epigenetic factors via non-parametric clustering and their association with allergic disease  
 Source: NIAID/NIH  
 Amount: \$69,617

**Role and % effort: Principal Investigator (10%AY,12%SM)**

CoRS 2019 (PI: Brook Harmon) 10/2019-06/2020  
 Title: Social Determinants of Health and Objective markers of Health Outcomes  
 Source: University of Memphis  
 Amount: \$2,500

**Role and % effort: Co-investigator (0%)**

R15AG058225 (PI: Gerhild Ullmann) 08/2018-07/2021  
 (terminated)  
 Title: Effects of mindful Feldenkrais exercises & strength training on cognitive executive function in independent living older adults  
 Source: NIA/NIH  
 Amount: \$430,451

**Role and % effort: Co-investigator (4%AY, 12%SM)**

Epidemiology, Biostatistics, and  
 Data Coordinating Center (PI: Matthew Smeltzer) 07/2017-04/2019  
 Title: Creating an Optimal Care Coordination Model for Lung Cancer Patients on Medicaid  
 Source: Association of Community Cancer Centers  
 Amount: \$320,000

**Role and % effort: Co-Investigator (15%)**

R01CA172253 (PI: Raymond Osarogiagbon) 04/2013-03/2018  
 Title: Dissemination of a Corrective Intervention to Improve Lymph Node Examination in Resected Lung Cancer  
 Source: NCI/NIH  
 Amount: \$2,864,321

**Role and % effort: Co-Investigator (15%)**

IH-1304-6147 (PI: Raymond Osarogiagbon) 02/2014 – 07/2017  
 Title: Building a Multidisciplinary Bridge Across the Quality Chasm in Thoracic Oncology.  
 Source: PCORI  
 Amount: \$2,103,889.20

**Role and % effort: Co-Investigator, Biostatistician (5%)**

## Publications

### Articles accepted/in press/epub ahead of print

Guo, Y., Westmoreland, D. A., D'Angelo, A., Mirzayi, C., Dearolf, M., Carneiro, P. B., Ray, M., Pantalone, D. W., Carrico, A. W., Patel, V. V., Golub, S. A., Hirshfield, S., Hoover, D., Nash, D., & Grov, C. (2023). PrEP discontinuation in a 4-year prospective U.S. national cohort of sexual and gender minority populations, 2017-22. *Health Affairs*. (Accepted)

### Articles Published

#### Statistical Methodology

1. **Ray M**, Bowman D, Csontos R, Van Arsdale RB, Zhang H. **2020**. A matrix-variate dirichlet process to model earthquake hypocentre temporal patterns. *Statistical Modelling*. 2020 Aug 25:1471082X20939767.
2. **Ray M**, Kang J, Zhang H, **2018**. Detecting Spatial Clusters via a Mixture of Dirichlet Processes. *Journal of Probability and Statistics*, 2018:3506794. Doi: 10.1155/2018/3506794.
3. **Ray M**, Tong X, Lockett GA, Zhang H, and Karmaus WJ, **2016**. An efficient approach to screening epigenome-wide data. *BioMed Research International*.
4. **Ray M**, Kang J, and Zhang H, **2016**. Identifying Activation Centers with Spatial Cox Point Processes Using fMRI Data. *IEEE/ACM Transactions on Computational Biology and Bioinformatics*, 13(6), pp.1130-1141.

#### Statistical Applications

1. Grov C, Guo Y, Westmoreland DA, D'Angelo AB, Mirzayi C, Dearolf M, Carneiro P, **Ray M**, Pantalone D, Carrico AW, Patel VV. Factors associated with PrEP-era HIV seroconversion in a 4-year US national cohort of n= 6059 sexual and gender minority individuals who have sex with men, 2017– 2022. *Journal of the International AIDS Society*. 2024 Jun;27(6):e26312.
2. Smeltzer MP, Akinbobola OA, **Ray MA**, Fehnel C, Saulsberry A, Dortch KR, Pimenta K, Matthews AT, Osarogiagbon RU. Prevalence of Epidermal Growth Factor Receptor and Programmed Death Ligand 1 Testing in a Population-Based Lung Cancer Surgical Resection Cohort from 2018 to 2022. *Cancer Epidemiology, Biomarkers & Prevention*. **2024** Jun 18:OF1-9.
3. Anton-Martin P, Modem V, Bridges B, Munoz AC, Paden M, **Ray M**, Sandhu HS. Timing of Kidney Replacement Therapy Initiation and Survival during Pediatric Extracorporeal Membrane Oxygenation: An Extracorporeal Life Support Organization Registry Study. *ASAIO Journal*. **2024** Jan 31:10-97.
4. Burch JB, Delage AF, Zhang H, McLain AC, **Ray MA**, Miller A, Adams SA, Hebert JR. Sleep disorders and cancer incidence: examining duration and severity of diagnosis among veterans. *Frontiers in Oncology*. **2024** Feb 26;14:1336487.
5. Guo Y, Westmoreland DA, D'Angelo A, Mirzayi C, Dearolf M, Carneiro PB, **Ray M**, Pantalone DW, Carrico AW, Patel VV, Golub SA. PrEP Discontinuation In A US National Cohort Of Sexual And Gender Minority Populations, 2017–22: Study examines PrEP

- discontinuation among sexual and gender minority populations. *Health Affairs*. **2024** Mar 1;43(3):443-51.
6. Guo Y, Westmoreland DA, D'Angelo AB, Mirzayi C, Dearolf M, **Ray M**, Carneiro PB, Pantalone DW, Carrico AW, Patel VV, Golub SA. PrEP Uptake and Methamphetamine Use Patterns in a 4-Year US National Prospective Cohort Study of Sexual and Gender Minority People, 2017–2022. *AIDS and Behavior*. **2024** Mar 4:1-9.
  7. Liao W, Fehnel C, Goss J, Shepherd CJ, Qureshi T, Matthews AT, **Ray MA**, Faris NR, Pinsky PF, Smeltzer MP, Osarogiagbon RU. Incidentally Detected Lung Cancer in Persons Too Young or Too Old for Lung Cancer Screening in a Mississippi Delta Cohort. *Journal of Thoracic Oncology*. **2024** Apr 1;19(4):589-600.
  8. Akinbobola O, Liao W, **Ray MA**, Fehnel C, Goss J, Qureshi T, Saulsberry A, Dortch K, Smeltzer MP, Osarogiagbon RU. Outcomes of resected lung cancer diagnosed through screening and incidental pulmonary nodule programs in a Mississippi Delta cohort. *JTO Clinical and Research Reports*. **2024** May 16:100684.
  9. West NT, Pichon LC, Ward KD, Rose N. San Diego E, **Ray M**, Rugless F, Powell TW, Campbell B, Lewis JC, McCann L, McNeal S. Perceived Health Needs of Church Leaders and Members: A Secondary Data Analysis of the Mid-South Congregational Health Survey. *Health promotion practice*. **2024** Jan;25(1):96-104.
  10. Bromley MI, Gain EP, **Ray MA**, Mzayek F, Kedia SK, Yu X. Burden of Chronic and Heavy Opioid Use Among Elderly Community Dwellers in the US. *AJPM focus*. **2024** Apr 1;3(2):100175.
  11. Liao W, **Ray M**, Fehnel C, Goss J, Shepherd CJ, Patel A, Qureshi T, Caro F, Roma J, Derrick A, Matthews AT. Program-Based Lung Cancer Care: A Prospective Observational Tumor Registry Linkage Study. *JTO Clinical and Research Reports*. **2024** Feb 1;5(2):100629.
  12. **Ray MA**, Akinbobola O, Fehnel C, Saulsberry A, Dortch K, Wolf B, Valaulikar G, Patel HD, Ng T, Robbins T, Smeltzer MP. Surgeon quality and patient survival after resection for non–small-cell lung cancer. *Journal of Clinical Oncology*. **2023** Jul 10;41(20):3616-28.
  13. Smeltzer MP, Liao W, Faris NR, Fehnel C, Goss J, Shepherd CJ, Ramos R, Qureshi T, Mukhopadhyay A, **Ray MA**, Osarogiagbon RU. Potential impact of criteria modifications on race and sex disparities in eligibility for lung cancer screening. *Journal of Thoracic Oncology*. **2023** Feb 1;18(2):158-68.
  14. Akinbobola O, **Ray MA**, Fehnel C, Saulsberry A, Dortch K, Smeltzer M, Faris NR, Osarogiagbon RU. Institution-level evolution of lung cancer resection quality with implementation of a lymph node specimen collection kit. *Journal of Thoracic Oncology*. **2023** Mar 15.
  15. Osarogiagbon RU, **Ray MA**, Fehnel C, Akinbobola O, Saulsberry A, Dortch K, Faris NR, Matthews AT, Smeltzer MP, Spencer D, Golembeski C. Two interventions on pathologic nodal staging in a population-based lung cancer resection cohort. *The Annals of Thoracic Surgery*. **2023** Sep 5.
  16. Smeltzer MP, **Ray MA**, Faris NR, Meadows-Taylor MB, Rugless F, Berryman C, Jackson B, Fehnel C, Pacheco A, McHugh L, Robbins ET. Prospective comparative effectiveness trial

- of multidisciplinary lung cancer care within a community-based health care system. *JCO oncology practice*. **2023** Jan;19(1):e15-24.
17. Shao H, Faris NR, Ward KD, Chen W, McHugh L, Smeltzer M, **Ray MA**, Osarogiagbon RU. Lung cancer patients' and caregivers' satisfaction with multidisciplinary versus serial care in a community healthcare setting: a prospective comparative-effectiveness cohort study. *Clinical Lung Cancer*. **2023** Jun 20.
  18. Shukr B, Bartelli D, Ward KD, **Ray M**, Maziak W, Mzayek F. The effect of exposure to tobacco smoking-related media messages on youths' smoking behavior in Jordan: A longitudinal, school-based study. *Preventive Medicine*. **2023** Jan 1;166:107386.
  19. Anton-Martin P, Zook N, Kochanski J, **Ray M**, Nigro JJ, Vellore S. Right atrial lines as primary access for postoperative pediatric cardiac patients. *Pediatric Cardiology*. **2023** Mar;44(3):702-13.
  20. Mahmood A, Kedia S, Dillon PJ, Kim H, Arshad H, **Ray M**. Food security status and breast cancer screening among women in the United States: Evidence from the Health and Retirement Study and Health Care and Nutrition Study. *Cancer Causes & Control*. **2023** Apr;34(4):321-35.
  21. Rathod A, Melaram R, Zhang H, Arshad H, Ewart S, **Ray M**, Relton CL, Karmaus W, Holloway JW. The association of DNA methylation at birth with adolescent asthma is mediated by atopy. *Clinical and experimental allergy: journal of the British Society for Allergy and Clinical Immunology*. **2023** Nov;53(11):1226-9.
  22. Osarogiagbon RU, Liao W, Faris NR, Meadows-Taylor M, Fehnel C, Lane J, Williams SC, Patel AA, Akinbobola OA, Pacheco A, Epperson A..... Lung cancer diagnosed through screening, lung nodule, and neither program: a prospective observational study of the detecting early lung cancer (DELUGE) in the Mississippi delta cohort. *Journal of Clinical Oncology*. **2022** Jul 7;40(19):2094
  23. Momtaz S, Moncrieff D, **Ray MA**, Bidelman GM. Children with amblyaudia show less flexibility in auditory cortical entrainment to periodic non-speech sounds. *International Journal of Audiology*. **2022** Jul 6:1-7.
  24. Anton-Martin P, Zook N, Kochanski J, **Ray M**, Nigro JJ, Vellore S. Right atrial lines as primary access for postoperative pediatric cardiac patients. *Pediatric Cardiology*. **2022** Sep 12:1-2.
  25. Smeltzer MP, **Ray MA**, Faris NR, Osarogiagbon RU. Genie out of the bottle: is there a role for gene-gene interactions in early detection of lung cancer?. *Journal of Thoracic Oncology*. **2022** Aug 1;17(8):946-8.
  26. Smeltzer MP, **Ray MA**. Statistical considerations for outcomes in clinical research: A review of common data types and methodology. *Experimental Biology and Medicine*. **2022** May;247(9):734-42.
  27. Mahmood A, **Ray M**, Ward KD, Dobalian A, Ahn S. Longitudinal associations between insomnia symptoms and all-cause mortality among middle-aged and older adults: a population-based cohort study. *Sleep*. **2022** Jun;45(6):zsac019.
  28. Meadows-Taylor MB, Faris NR, Smeltzer MP, **Ray MA**, Fehnel C, Akinbobola O, Ariganjoye

- F, Patel A, Pacheco A, Mehrotra A, Fox R. The Relative Survival Impact of Guideline-Concordant Clinical Staging and Stage-Appropriate Treatment of Potentially Curable Non-Small Cell Lung Cancer. *Chest*. **2022** Feb 3.
29. **Ray MA**, Faris NR, Fehnel C, Derrick A, Smeltzer MP, Meadows-Taylor MB, Ariganjoye F, Pacheco A, Optican R, Tonkin K, Wright J. **2021**. Survival Impact of an Enhanced Multidisciplinary Thoracic Oncology Conference in a Regional Community Health Care System. *JTO clinical and research reports*. 2021 Aug 1;2(8):100203. <https://doi.org/10.1016/j.jtocrr.2021.100203>.
  30. **Ray MA**, Fehnel C, Akinbobola O, Faris NR, Taylor M, Pacheco A, Smeltzer MP, Osarogiagbon RU. **2021**. Comparative effectiveness of a lymph node collection kit versus heightened awareness on lung cancer surgery quality and outcomes. *Journal of Thoracic Oncology*. 2021 May 1;16(5):774-83.
  31. Osarogiagbon RU, Smeltzer MP, Faris NR, **Ray MA**, Fehnel C, Ojeabulu P, Akinbobola O, Meadows-Taylor M, McHugh LM, Halal AM, Levy P. **2021**. Outcomes after use of a lymph node collection kit for lung cancer surgery: A pragmatic, population-based, multi-institutional, staggered implementation study. *Journal of Thoracic Oncology*. 2021 Apr 1;16(4):630-42.
  32. Mahmood A, **Ray M**, Dobalian A, Ward KD, Ahn S. **2021**. Insomnia symptoms and incident heart failure: a population-based cohort study. *European heart journal*. 2021 Oct 21;42(40):4169-76.
  33. Smeltzer MP, Faris NR, Fehnel C, Akinbobola O, Saulsberry A, Meadows-Taylor M, Pacheco A, **Ray M**, Osarogiagbon RU. **2021**. Impact of a lymph node specimen collection kit on the distribution and survival implications of the proposed revised lung cancer residual disease classification: a propensity-matched analysis. *JTO clinical and research reports*. 2021 Apr 1;2(4):100161.
  34. Smeltzer MP, Boehmer LM, Kramar A, Asfeldt TM, Faris NR, Amorosi CF, **Ray MA**, Nolan VG, Oyer RA, Lathan CS, Osarogiagbon RU. **2021**. An optimal care coordination model for Medicaid patients with lung cancer: results from beta model testing. *Oncology Issues*. 2021 May 4;36(3):80-94.
  35. Smeltzer MP, Lee YS, Faris NR, Fehnel C, Akinbobola O, Meadows-Taylor M, Spencer D, Sales E, Okun S, Giampapa C, Anga A, Pacheco A, **Ray MA**, and Osarogiagbon R. **2021**. Trends in Accuracy and Comprehensiveness of Pathology Reports for Resected NSCLC in a High Mortality Area of the United States. *Journal of Thoracic Oncology*. 2021 Oct 1;16(10):1663-71.
  36. Meadows-Taylor M, Ward KD, Chen W, Faris NR, Fehnel C, **Ray MA**, Ariganjoye F, Berryman C, Houston-Harris C, McHugh LM, Pacheco A, and Osarogiagbon R. **2021**. Interest in Cessation Treatment Among People Who Smoke in a Community-Based Multidisciplinary Thoracic Oncology Program. *JTO clinical and research reports*. 2021 Jun 1;2(6):100182.
  37. Osarogiagbon RU, **Ray MA**, Faris NR, Smeltzer MP. **2021**. Response to: "Lymph Node Dissection for Non-Small-Cell Lung Cancer at Whose Discretion?". *Journal of Thoracic Oncology*. 2021 May 1;16(5):e36-7

38. Feenaughty L, Guo LY, Weinstock-Guttman B, **Ray M**, Benedict RH, Tjaden K. **2020**. Impact of Cognitive Impairment and Dysarthria on Spoken Language in Multiple Sclerosis. *Journal of the International Neuropsychological Society*. Nov 16:1-1.
39. Osarogiagbon RU, **Ray M**, Faris NR, Smeltzer MP. **2020**. Response to Clinical Thoughts on Mediastinal Node Management in Early-Stage Lung Cancer. *Journal of Thoracic Oncology*. 2020 Nov 1;15(11):e185-6.
40. **Ray M**, Smeltzer MP, Faris NR, Osarogiagbon RU. **2020**. Survival After Mediastinal Node Dissection, Systematic Sampling, or Neither for Early Stage NSCLC. *Journal of Thoracic Oncology*. Jun 20.
41. **Ray M**, Faris NR, Derrick A, Smeltzer MP, Osarogiagbon RU. **2020**. Rurality, Stage-Stratified Use of Treatment Modalities and Survival of Non-small Cell Lung Cancer. *Chest*. May 6.
42. Ullmann G, Li Y, **Ray M**, Lee ST. **2020**. Study protocol of a randomized intervention study to explore effects of a pure physical training and a mind–body exercise on cognitive executive function in independent living adults age 65–85. *Aging clinical and experimental research*. Jun 22:1-8.
43. Mahmood A, Kim H, Kabir U, Kedia S, **Ray M**, **2020**. Food insecurity and influenza and pneumonia vaccines uptake among community-dwelling older adults in the United States. *Journal of Community Health* (e-pub ahead of print).
44. Osarogiagbon R, Faris N, Stevens W, Fehnel C, Houston-Harris C, Ojeabulu P, Akinbobola OA, Lee YS, **Ray M**, Smeltzer M, **2020**. Beyond Margin Status: Population-Based Validation of the Proposed International Association for the Study of Lung Cancer Residual Tumor Classification Recategorization. *Journal of Thoracic Oncology*. 15(3):371-82.
45. Osarogiagbon R, Lee YS, Faris N, **Ray MA**, Ojeabulu P, Smeltzer MP, **2019**. Invasive mediastinal staging for resected non–small cell lung cancer in a population-based cohort. *The Journal of thoracic and cardiovascular surgery*. 158(4):1220-9.
46. Smeltzer M, Faris N, **Ray M**, Fehnel C, Houston-Harris C, Ojeabulu P, Akinbobola O, Lee YS, Meadows M, Signore R, Wiggins L, **2019**. Survival Before and After Direct Surgical Quality Feedback in a Population-Based Lung Cancer Cohort. *The Annals of Thoracic Surgery*. 107(5):1487-93. pii: S0003-4975(18)31859-9. doi: 10.1016/j.athoracsur.2018.11.058.
47. **Ray M**, Faris NR, Smeltzer MP, Fehnel C, Houston-Harris C, Levy P, Wiggins L, Sachdev V, Robbins T, Spencer D, Osarogiagbon RU, **2018**. Effectiveness of implemented interventions on pathologic nodal staging of non-small cell lung cancer. *The Annals of Thoracic Surgery*. 106(1):228-34. pii: S0003-4975(18)30333-3. doi: 10.1016/j.athoracsur. 2018.02.021. PMID:29534956
48. Smeltzer M, Faris N, **Ray M**, Osarogiagbon R, **2018**. Association of pathologic nodal staging quality with survival among patients with non-small cell lung cancer after resection with curative intent. *JAMA Oncol*. doi: 10.1001/jamaoncol.2017.2993. PMID:28973110
49. Smeltzer M, Rugless F, Jackson B, Berryman C, Faris N, **Ray M**, Meadows M, Patel A, Roark K, Kedia S, DeBon M, Crossley F, Oliver G, McHugh L, Hastings W, Osborne O, Osborne J, III T, III M, Jones W, Lee H, Signore R, Fox R, Li J, Robbins E, Ward K, Klesges



- L, Osarogiagbon RU, **2018**. Pragmatic trial of a multidisciplinary lung cancer care model in a community healthcare setting: study design, implementation evaluation, and baseline clinical results. *Transl Lung Cancer Res*. 7(1):88-102. doi: 10.21037/tlcr.2018.01.02. PMID:29535915.
50. Smith A, **Ray M**, Chalet S. **2018**. Primary Palate Trauma in Patients Presenting to US Emergency Departments, 2006-2010. *JAMA Otolaryngology*, 144(3):244-251. doi: 10.1001/jamaoto.2017.3071.
  51. Etchison AR, Bos L, **Ray M**, McAllister KB, Mohammed M, Park B, Phan AV, Heitz C, **2018**. Low-dose Ketamine Does Not Improve Migraine in the Emergency Department: A Randomized Placebo-controlled Trial. *West J Emerg Med*. 19(6):952-960. doi: 10.5811/westjem.2018.8.37875. [Epub 2018 Sep 10].
  52. Smith A, **Ray M**, Jain N, Zhang H, and Sebelik M, **2017**. The burden of angioedema on United States emergency departments: 2006–2010. *The Laryngoscope*, 127(4), 828-834.
  53. Kaushal A, Zhang H, Karmaus WJJ, **Ray M**, Torres M, Smith A, and Wang S, **2017**. Comparison of different cell type correction methods for genome-scale epigenetics studies. *BMC Bioinformatics*.
  54. Osarogiagbon R, **Ray M**, Faris N, Smeltzer M, Fehnel C, Houston-Harris C, Signore R, McHugh L, Levy P, Wiggins L, Sachdev V, and Robbins E, **2017**. Prognostic Value of National Comprehensive Cancer Network Lung Cancer Resection Quality Parameters. *The Annals of Thoracic Surgery*.
  55. Bowers K, McAllister K, **Ray M** and Heitz C, **2017**. Ketamine as an Adjunct to Opioids for Acute Pain in the Emergency Department: A randomized controlled trial. *Academic Emergency Medicine*.
  56. Smith A, Thimmappa V, Shepherd B, **Ray M**, Sheyn A, and Thompson J, **2016**. Invasive fungal sinusitis in the pediatric population: Systematic review with quantitative synthesis of the literature. *International Journal of Pediatric Otorhinolaryngology*, 90, pp.231-235.
  57. Lockett GA, Soto-Ramírez N, **Ray M**, Everson TM, Xu CJ, Patil VK, Terry W, Kaushal A, Rezwan FI, Ewart SL, and Gehring U, **2016**. Association of season of birth with DNA methylation and allergic disease. *Allergy*, 71(9), pp.1314-1324.
  58. Alexander M, **Ray M**, Hébert JR, Youngstedt SD, Zhang H, Steck SE, Bogan RK and Burch JB, **2016**. The National Veteran Sleep Disorder Study: Descriptive Epidemiology and Secular Trends, 2000-2010. *Sleep*, 39(7), pp.1399-1410.
  59. Quraishi BM, Zhang H, Everson TM, **Ray M**, Lockett GA, Holloway JW, Tetali SR, Arshad SH, Kaushal A, Rezwan FI, and Karmaus W, **2015**. Identifying CpG sites associated with eczema via random forest screening of epigenome-scale DNA methylation. *Clinical epigenetics*, 7(1), p.68.
  60. Alexander M, Burch JB, Steck SE, Chen CF, Hurley TG, Cavicchia P, **Ray M**, Shivappa N, Guess J, Zhang H, and Youngstedt SD. **2015**. Case-control study of the PERIOD3 clock gene length polymorphism and colorectal adenoma formation. *Oncology reports*, 33(2), pp.935-941.
  61. **Ray M**, Youngstedt SD, Zhang H, Robb SW, Harmon BE, Jean-Louis G, Cai B, Hurley TG,

- Hébert JR, Bogan RK, and Burch JB. **2014**. Examination of wrist and hip actigraphy using a novel sleep estimation procedure. *Sleep science*, 7(2), pp.74-81.
62. Zhang H, Tong X, Holloway JW, Rezwan FI, Lockett GA, Patil V, **Ray M**, Everson TM, Soto-Ramírez N, Arshad SH, and Ewart S. **2014**. The interplay of DNA methylation over time with Th2 pathway genetic variants on asthma risk and temporal asthma transition. *Clinical epigenetics*, 6(1), p.8.
63. Mumtaz MM, **Ray M**, Crowell SR, Keys D, Fisher J, and Ruiz P. **2012**. Translational Research to Develop a Human PBPK Models Tool Kit—Volatile Organic Compounds (VOCs). *Journal of Toxicology and Environmental Health, Part A*, 75(1), pp.6-24.
64. Ruiz P, **Ray M**, Fisher J, and Mumtaz M. **2011**. Development of a human physiologically based pharmacokinetic (PBPK) toolkit for environmental pollutants. *International journal of molecular sciences*, 12(11), pp.7469-7480.

### **Statistical Packages**

1. Handwerker J, Sobral L, and **Ray M**, **2021**. RHclust: Vectors in Partitioning. R Core Team. R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL: <http://www.R-project.org>. (package senior-author)
2. Terry W, **Ray M**, and Zhang H, **2016**. PathSeletMP: Backwards Variable Selection for paths using M Plus. R Core Team. R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL: <http://www.R-project.org>. (package co-author)
3. **Ray M**, Tong X, and Zhang H, **2014**. ttScreening: Genome-wide DNA methylation sites screening by use of training and testing samples. R Core Team. R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL: <http://www.R-project.org>. (package maintainer)
4. Bao W, Tong X, **Ray M**, and Zhang H, **2014**. RegClust: Cluster analysis via regression coefficients. R Core Team. R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL: <http://www.R-project.org>. (package maintainer)

### **Manuscripts Submitted**

1. Rogers J, Jarmulowicz L, Buder E, and **Ray M**. **2023**. Speech disfluencies during a derived word production task: Relationships with lexical access and phonological processing. *Language and Speech*. (Submitted)
2. Sultana S, Zhang H, Xie L, Jiang Y, **Ray M**. Impact of influential data on screening epigenome-wide data. *BMC Bioinformatics* (submitted)
3. Westmoreland D, Sultana S, **Ray M**, Bleasdale J, Argenio K, Krueger E, and Grov C. Dismantling stereotypes about being top, versatile, or bottom: Sexual minority men's anal sex position identity as it relates to attraction, sexual behavior, and anthropomorphic characteristics. *Journal of Sex Research*. (provisionally accepted)
4. Westmoreland D\*, **Ray M\***, Sultana S, Mirzayi C, D'Angelo A, Stief M, Bleasdale J, Robertson M, Hoover D, Hirshfel S, Patel V, Pantalone D, Carrico A, Golub S, Nash D, and

Grov C. Implementing a large-scale technology-mediated cohort to study HIV incidence and PrEP uptake among vulnerable cisgender men, transgender men and transgender women in the U.S., the Together 5,000 cohort. American Journal of Epidemiology. (under multiple revisions) \* Westmoreland and Ray will share first author.

5. Plaxco A, Kmet J, Nolan V, Smeltzer M, Ray M, Taylor M, Sweat D, and Bonnal M. Potential Productive Life Lost and Economic Impact due to COVID-19 Death: A Population and County Level Analysis. Journal of Community Health. (submitted)
6. Liao W, Smeltzer M, Goss J, Qureshi T, Johnson S, Harris M, Dortch K, Fehnel C, Ray M, and Osarogiagbon R. Incidentally-Detected Lung Cancer in Different Cigarette Smoking Exposure Populations in a Prospective Mississippi Delta Cohort Study. CHEST (submitted)
7. Anton-Martin, P, Coalter C, Briceno-Medina M, Ray M, DeAvilla K, and Rayburn M. Dosing of clopidogrel in high-risk cardiovascular pediatric patients with P2Y12 Reaction Unit Monitoring (DRUM trial). (submitted, revising to submission to different journal)

### ***Presentations (only for last three years)***

#### ***Invited Speaker***

1. Invited speaker for the Institute for Intelligent Systems Lightning Research Talks, University of Memphis, November 21, 2024.
2. Invited speaker for the ICSA Applied Statistics Symposium, Session: New methods in biomedical data analysis with the applications to genomics studies, June 18, 2024, Nashville, TN. "Using a novel non-parametric clustering approach to identifying patterns of multi-genetic/epigenetic factors".

#### ***Invited Panel Discussant***

1. Invited Panelist (1 of 3) for the ACHE Chapter, MidSouth Health Care Executives panel event April 20, 2023 on population health, specifically titled "Improving the Health Status of Your Community."

#### ***Conference/Workshop Oral Presentations***

The presenter is listed as the first author.

1. Akinbobola O, **Ray M**, Smeltzer MP, Fehnel C, Saulsberry A, Dortch K, Osarogiagbon RU. Evolution of overall survival (OS) after curative-intent lung cancer surgery in a population-based Mississippi Delta cohort. Oral Presentation at the ASCO Quality Care Symposium, September 27-28, 2024 in Chicago, Illinois.
2. Liao W, Patel A, Caro F, Roma J, Marshall W, Goss J, Fehnel C, Mehrotra a, Ogbeide O, Lammers P, Tonkin K, Machin J, **Ray M**, Smeltzer M, and Osarogiagbon O. Missed Opportunities for Early Lung Cancer Detection in a Multi-Disciplinary Thoracic Oncology Clinic Cohort. Oral Presentation at IASLC WCLC, **September 7-10, 2024** in San Diego, California.

3. Smeltzer M, Liao W, Fehnel C, Goss J, Qureshi T, Peppers S, **Ray M**, Osarogiagbon RU. Smoking history requirement and lung cancer (LC) screening (LCS) eligibility disparities. Oral Presentation at ASCO, **June 2-6, 2024** in Chicago, Illinois.
4. Sultana S\*, Xie L, Jiang Y, Zhang H, **Ray M**. Impact of influential data on screening epigenome-wide data. Oral Presentation at JSM, **August 5-10, 2023**, Toronto, Canada.  
\*Due to VISA issues, I had to present on Samia's behalf.
5. **Ray MA**, Smeltzer MP, Faris NR, Fehnel C, Akinbobola W, Saulsberry A, Dortch K, Pacheco A, Levy P, Ng T, Robbins ET, Osarogiagbon RU. Survival Impact of Benchmarking Lung Cancer Surgeons' Performance by Quality Metrics. Abstract #2022-RA-2480-WCLC. WCLC 2022; **August 6-9, 2022**; Vienna, Austria
6. Sultana S, Hongmei Z, Jiang Y, Xie L, and **Ray M**. Impact of influential data on screening epigenome-wide data. Oral presentation at WTASA Annual Research Symposium meeting on **November 4, 2022**.
7. Xie L, Hongmei Z, **Ray M**, and Jiang Y. ttScreening: an Efficient R Package to Screening Epigenome-Wide Data. Oral presentation at WTASA Annual Research Symposium meeting on **November 4, 2022**.
8. Osarogiagbon R, Liao W, Faris N, Smeltzer, Meadows-Taylor M, **Ray M**, Fehnel C, Goss J, Williams S, Akinbobola O, Pacheco A, Epperson A, Luttrell J, McCor D, Lammers P, Bishop A, Tonkin K, Optican R, Wright J, and Robbins T. Lung Cancer Detected by Screening, Incidental Lung Nodule Program and Neither: A Prospective Observational Study. Oral presentation at IASLC WCLC **2021 September 12, 2021**.
9. **Ray M**, Lee Y, Faris N, Fehnel C, Akinbobola O, Meadows-Taylor M, Spencer D, Sales E, Okun S, Giampap C, Anga A, Pacheco A, Smeltzer M, and Osarogiagbon R. Intrapulmonary Lymph Node (LN) Retrieval With a Novel Gross Dissection Method: A Prospective, Population-Based Cohort Study. Oral presentation at IASLC WCLC 2021 **September 12, 2021**.
10. Mahmood A, **Ray MA**, Dobalian A, Ward K, and Ahn S. (**October 2021**). Association between insomnia symptoms and incident heart failure among middle-aged and older adults: A population-based cohort study. Oral presentation at the American Public Health Association annual meeting.
11. West NT, San Diego ERN, Calvin V, Pichon LC, Ward KD, **Ray MA**, Rugless F, Lewis J, McNeal S, Campbell B, Hales L, Harmon BE. (**October 2021**). Examining self-reported needs of church leaders and church members: A secondary data analysis of the mid-south congregational health survey. Oral presentation at the American Public Health Association annual meeting.

#### Posters/E-Abstracts

1. Liao W, Smeltzer MP, **Ray M**, Goss J, Patel A, Stevenson C, Fehnel C, Ogbeide O, Mehrotra A, Wollak I, Lammers PE. Structured multidisciplinary decision making and survival in the prospective observational Detecting Early Lung Cancer (DELUGE) in the Mississippi Delta cohort. Poster at ASCO Quality Care Symposium, **September 27-28, 2024** in Chicago, Illinois.

2. **Ray M**, Ely S, Akinbobola O, Fehnel C, Saulsberry A, Dortch K, Smeltzer M, and Osarogiagbon O. Concordance between lymph node station examination reported on a checklist and the final pathology report after curative lung cancer resection. E-poster at IASLC WCLC, **September 7-10, 2024**, in San Diego, California.
3. Liao W, Goss J, Qureshi T, Peppers S, Harris A, Porter A, Dortch K, Patel A, Caro F, Roma J, Marshall W, Fehnel C, Mehrotra A, Ogbeide O, Lammer P, Tonkin K, Machin J, Zhao J, Ny T, **Ray M**, Smeltzer M, and Osarogiagbon R. Barriers to Maximal Screening Impact in Persons Diagnosed with Lung Cancer in a Prospective Cohort. Poster at IASLC WCLC, **September 7-10, 2024**, in San Diego, California.
4. Akinbobola O, Smeltzer M, Minhas A, Ogbeide O, Ely S, Saulsberry A, Dortch K, Fehnel C, Ny T, Zhao J, **Ray M**, and Osarogiagbon R. Outcomes with Evolving Patterns of Neoadjuvant Therapy: A Population-Based Analysis. E-poster at IASLC WCLC, **September 7-10, 2024**, in San Diego, California.
5. Akinbobola O, Ely S, **Ray M**, Fehnel C, Saulsberry A, Dortch K, Minhas A, Ng T, Zhao J, Smeltzer M, and Osarogiagbon R. Evolution of Use of Sublobar Resection in a US Population-Based Cohort Before and After Two Randomized Controlled Trials. E-poster at IASLC WCLC, **September 7-10, 2024**, in San Diego, California.
6. Ogbeide O, Liao W, **Ray M**, Goss J, Patel A, Qureshi T, Akinbobola O, Peppers S, Harris A, Porter A, Dortch K, Saulsberry A, Fehnel C, Smeltzer M, and Osarogiagbon R. Discordance Between Nodule and Lung Cancer Location in Early Lung Cancer Detection Cohorts. E-poster at IASLC WCLC, **September 7-10, 2024**, in San Diego, California.
7. Doan M, Plaxco A, **Ray MA**, Kmet J. Analysis of Viral Load Trends in Shelby County, Tennessee. Poster Presentation at **TPHA 2023**, Nashville, TN.
8. **Handwerker JK\***, **Ray M**. Non-parametric clustering of joint pattern multi-genetic/epigenetic factors weighted by covariates. Poster Presentation at JSM, August 5-10, 2023 in Toronto, Canada.
9. Akinbobola O, Liao W, Faris NR, Fehnel C, Goss J, Shepherd CJ, Qureshi T, Peppers S, Harris A, Porter A, Patel A, Caro F, Roma J, Matthews AT, **Ray MA**, Smeltzer MP, Osarogiagbon R. Lead-Time Bias in Surgically Resected Non-Small Cell Lung Cancer (NSCLC) Diagnosed through Different Pathways of Care. E-Poster at IASLC WCLC, September 9-12, 2023 in Singapore.
10. Akinbobola O, Minhas A, Ogbeide O, Faris NR, Fehnel C, Saulsberry A, Dortch K, Matthews AT, Smeltzer MP, **Ray MA**, Osarogiagbon RU. Outcomes of Surgical Treatment for Stage IV Non-Small Cell Lung Cancer (NSCLC) in a Population-Based Cohort. E-Poster at IASLC WCLC, September 9-12, 2023 in Singapore.
11. Liao W, Faris N, Fehnel C, Goss J, Shepherd C, Qureshi T, Peppers S, Harris A, Porter A, Matthews A, **Ray M**, Smeltzer P, Osarogiagbon R. Incidentally-Detected Lung Cancer in Persons Too Young or Too Old for Lung Cancer Screening. E-Poster at IASLC WCLC, September 9-12, 2023 in Singapore.
12. **Ray MA**, Matthews AT, Akinbobla O, Smeltzer M, Fehnel C, Faris NR, Saulsberry A, Dortch K, Muhit S, Osarogiagbon R. Identifying the optimal number of lymph node stations for improving survival in resections for non-small cell lung cancer. E-Poster at IASLC WCLC, September 9-12, 2023 in Singapore.

13. Akinbobola O, **Ray MA**, Fehnel C, Saulsberry A, Dortch K, Matthews AT, Faris NR, Godfrey CM, Smeltzer M, Osarogiagbon RU. Evolution of curative-intent lung cancer surgery in a 4 eras in the population-based mid-south quality of surgical resection (MS-QSR) cohort. Cancer Research. 2023 Apr 4;83(7\_Supplement):4382-. Poster Presentation at AACR, April 14-19, 2023 in Orlando, Florida.
14. Shao H, Lee YS, Fehnel C, Akinbobola O, Saulsberry A, Dortch K, Matthews AT, Faris NR, Smeltzer M, **Ray MA**, Osarogiagbon RU. Comparative characteristics of stage I non-small cell lung cancer (NSCLC) patients segregated by quality of surgery and survival in a population-based cohort. Cancer Research. 2023 Apr 4;83(7\_Supplement):3216. Poster Presentation at AACR, April 14-19, 2023 in Orlando, Florida.
15. **Ray MA**, Fehnel C, Akinbobola O, Saulsberry A, Dortch K, Matthews A, Anga A, Giampapa C, Sales E, Okun S, Robbins ET. Interventions to improve pathologic nodal staging of curatively resected lung cancer: A population-based implementation study. Cancer Research. 2023 Apr 4;83(7\_Supplement):4359-. Poster Presentation at AACR, April 14-19, 2023 in Orlando, Florida.
16. Shao H, Lee YS, Fehnel C, Akinbobola O, Saulsberry A, Dortch K, Matthews AT, Faris NR, **Ray MA**, Smeltzer M, Osarogiagbon RU. Hierarchy of prognostic quality markers after curative-intent resection of stage IA non-small cell lung cancer. Cancer Research. 2023 Apr 4;83(7\_Supplement):4372. Poster Presentation at AACR, April 14-19, 2023 in Orlando, Florida.
17. **Ray M**, Matthews AT, Akinbobola O, Smeltzer M, Fehnel C, Faris NR, Saulsberry A, Dortch K, Muhit S, Osarogiagbon RU. Optimal number of lymph node stations associated with improved survival among patients with non-small cell lung cancer (NSCLC). Poster Presentation at ASCO, June 2-6, 2023 in Chicago, Illinois.
18. Smeltzer M, Akinbobola O, **Ray M**, Fehnel C, Saulsberry A, Dortch K, Faris NR, Pimenta K, Matthews AT, Osarogiagbon RU. Prevalence of EGFR and PDL1 testing in a population-based lung cancer surgical resection cohort from 2018-2022. Poster Presentation at ASCO, June 2-6, 2023 in Chicago, Illinois.
19. Liao W, Derrick A, Goss J, Shepherd CJ, Qureshi T, Patel A, Fehnel C, Faris NR, **Ray M**, Osarogiagbon RU. Real-world program-based lung cancer care. Poster Presentation at ASCO, June 2-6, 2023 in Chicago, Illinois.
20. Westmoreland, D., **Sultana, S\***, **Ray, M.**, Argenio, K., Krueger, E., & Grov, C. An exploration of sex position identity based on sexual behavior, attraction to partners' traits, and personal anthropomorphic characteristics among cisgender men who have sex with men. Abstract accepted for presentation at the 2023 annual meeting of The Society for the Scientific Study of Sexuality, Nov. 16-19, 2023, New Orleans, LA.
21. Mahmood A, Ray MA, Kedia S, Ward K, Dobalian A, Ahn S. Insomnia symptoms and the risk of "cognitive impairment, no dementia (CIND)" among middle-aged and older adults in the US. Poster Presentation. Poster Presentation at the 44th Annual Meeting & Scientific Sessions of the Society of Behavioral Medicine, which will be held April 26- April 29, 2023, at the Sheraton Downtown Phoenix in Phoenix, AZ
22. Bokharaei S, et al. **2022**. Children with amblyaudia show less flexibility in auditory cortical entrainment to periodic non-speech sounds. Poster presented at Mid-South Conference through NSSLHA, **February 23, 2022** in Memphis, TN.

23. Akinbobola O, Faris NR, Smeltzer MP, **Ray MA**, Fehnel C, Pacheco A, Saulsberry A, Dortch K, Wiggins HL, Talton D, Eubanks R, Stevenson DR, Valaulikar G, Patel H, Wolf B, Koury A, Levy P, Ng T, Robbins ET, Osarogiagbon RU. Evolution of Lung Cancer Resection Quality: A Prospective Staggered Implementation Quality Improvement Study. Poster presented at WCLC 2022; **August 6-9, 2022**; Vienna, Austria.
24. Smeltzer M, Liao W, Faris N, Fehnel C, Lane J, Williams S, Ramos R, Qureshi T, Pacheco A, Mukhopadhyay A, **Ray M**, Robbins T, Wright J, and Osarogiagbon R. The Impact of Modified Screening Eligibility Criteria on Race and Sex Disparities in Lung Cancer Screening. Poster presented at WCLC 2022; **August 6-9, 2022**; Vienna, Austria.

## Teaching

### **Courses taught at the University of Memphis**

#### Graduate courses

<u>Course</u>	<u>Year</u>	<u>Role</u>
Biostatistical Methods I	F: 2015-2018	Co-instructor
Biostatistical Methods I Online	F: 2016-2018	Co-instructor
Biostatistical Methods I	F: 2021-2024	Instructor
Biostatistical Methods I Online	F: 2019-2024;S: 2021-2025	Instructor
Biostatistical Methods II	S: 2016-2018	Co-instructor
Biostatistical Methods II Online	F: 2018; S:2018	Co-instructor
Biostatistical Methods II	S: 2019-2020	Instructor
Bioinformatics Project	S: 2017-2018	Instructor
Advanced Survival Analysis	S: 2022, 2024-25	Instructor
Independent Study-Data Mining	F: 2022, 2023	Instructor
Guided Research	S: 2023-24	Instructor
R and Python in Public Health	S: 2025	Co-instructor

## Memberships

### **Memberships**

2018-present	International Association for the Study of Lung Cancer
2017-present	American Society of Clinical Oncology
2015-present	Western Tennessee Chapter of the American Statistical Association
2014-present	American Statistical Association
2006-present	Chi Alpha Sigma National Honor Society
2006-present	Kappa Mu Epsilon Honor Society for Mathematics Majors
2006-present	Delta Epsilon Iota Academic Honor Society
2013-present	Golden Key International Honor Society
2007-present	Piedmont Torch Honor Society

## Service

### **Journals Reviewed**

- JTO

- Statistics in Medicine
- JASA
- JAMA Oncology
- JAS
- Quaesitum (University of Memphis undergraduate journal)
- Computational and Mathematical Methods in Medicine
- Journal of Psychosomatic Research
- The American Journal of Medical Sciences
- Springer Book for the 6th Workshop on Biostatistics and Bioinformatics

### **Honors/Awards**

2017	Marquis Who's Who in the World
2014	Outstanding Student for Biostatistics Department 2014
2012-2013	HRSA Fellowship 2012-2013
2011-2012	ARRA Funding Award 2011-2012
2011	Best Presentation Award, 14 <sup>th</sup> International Workshop on QSARs in Environmental and Health Sciences Conference
2007	Graduated Magna Cum Laude - Piedmont College
2006	Named to Who's Who Among Students in American Universities and Colleges