

# ISAAC B. MICHAEL

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## MISSION STATEMENT

Analytical depth, operational leadership, and systems-level thinking define my professional journey. I bring a versatile blend of research expertise, statistical programming, and cross-sector collaboration, honed through leading national data modernization efforts, mentoring researchers, and optimizing workflows across government, academic, and consulting environments. My work consistently bridges technical rigor with strategic insight to deliver solutions that are scalable, impactful, and built for long-term value.

## PROFESSIONAL EXPERIENCE

### Research Scientist

#### Public-Sector Client, NDA

📅 Apr 2025 – Present    📍 Atlanta, GA

**Summary:** Contracted as a Research Scientist to support the continuity and modernization of national public health data systems through advanced analytics, infrastructure planning, and strategic consultation. Role bridges technical expertise with operational oversight to ensure scalable, policy-relevant outcomes for state partners.

- **Data Strategy & Analytics Leadership:** Direct design, weighting, and analysis of large-scale survey data to inform funding, program delivery, and policy.
- **Operational Efficiency:** Lead automation of high-complexity workflows using SAS, R, and Python, significantly reducing manual labor and increasing reporting reliability.
- **Public Sector Client Engagement:** Advise state health departments and stakeholder groups, translating technical findings into actionable insights for leadership teams.
- **System Transition & Risk Mitigation:** Support the strategic shift from federal to private oversight, guiding infrastructure modernization and ensuring data continuity.

### Mathematical Statistician

#### CDC - Division of Reproductive Health

📅 Jun 2023 – Present    📍 Atlanta, GA

**Summary:** Co-led strategic operations and data infrastructure for the Centers for Disease Control and Prevention’s Pregnancy Risk Assessment Monitoring System (PRAMS), supporting jurisdictions representing 81% of all U.S. births. Served as Principal Statistician overseeing national data weighting, workflow optimization, and reporting systems. Designed reproducible infrastructure in SAS, R, and Python that modernized data delivery, reduced operational overhead, and improved decision-making at federal and state levels.

- **Operational Oversight & Stakeholder Leadership:** Directed cross-functional collaboration across 50+ jurisdictions, aligning analytics, QA, program goals, and federal policy needs. Translated complex data issues into executive-ready updates and strategic recommendations for CDC leadership.
- **Systems Modernization & Workflow Automation:** Built modular, scalable SAS infrastructure with automated QA diagnostics, cutting manual workload and increasing reproducibility—serving as a blueprint for future CDC systems.

## KEY ACCOMPLISHMENTS



### Led National PRAMS Data Weighting for Public Health

Oversaw CDC PRAMS data weighting operations for the 2022–2023 cohort, covering 81% of U.S. live births. Delivered high-integrity datasets to over 50 state partners, supporting funding allocations and maternal-child health strategy nationwide.



### Modernized PRAMS Analytics Infrastructure

Designed and automated scalable SAS- and SQL-based workflows that reduced manual processing time, improved data quality assurance, and enabled reproducible reporting—advancing operational efficiency across federal programs.



### Shaped Data-Driven Policy Through Statistical Research

Co-authored CDC and state-level studies influencing national health recommendations. Integrated advanced statistical modeling and bias analysis to enhance transparency, compliance, and risk mitigation in public datasets.



### Directed Operations for Grant-Funded STEM Programs

Led strategic growth of LSU’s Virtual Math Circle and BEE programs. Secured funding, expanded access for underserved students, and managed multi-phase budgets, staffing, and curriculum delivery across 100+ participants.

- **Data-Driven Strategy & Risk Analysis:** Applied advanced statistical methods to improve sampling logic, reduce bias, and inform critical funding decisions. Co-authored methodological guidance that impacted federal approval standards.
- **Reporting & Strategic Communication:** Delivered actionable reporting, dashboards, and visualizations to internal teams and external stakeholders, enhancing transparency and data-driven planning across public health agencies.
- **Federal Program Impact & Cost Efficiency:** Enabled more efficient delivery of public health data, influencing funding streams, national policy, and strategic goals across multiple government tiers.

Program Director

LSU - Gordon A. Cain Center for STEM Literacy

May 2020 – Present Baton Rouge, LA / Atlanta, GA

**Summary:** Direct operations, finances, and strategic growth for the Virtual Math Circle (VMC), a statewide STEM outreach initiative hosted by Louisiana State University's Gordon A. Cain Center for STEM Literacy. Lead budgeting, hiring, communications, and funding acquisition to ensure program sustainability, compliance, and operational efficiency.

- **Financial Oversight & Compensation Management:** Managed program stipends, coordinated payroll with HR, and ensured timely payments to mentors and staff.
- **Hiring & Onboarding:** Drafted job descriptions, extended offers, oversaw onboarding, and optimized the hiring pipeline in partnership with LSU HR.
- **Grant Funding & Compliance:** Secured recurring external grants (e.g., AMS Epsilon Grant), supporting student stipends and growth; ensured fiscal compliance and timely reporting.
- **Process Optimization & AI Integration:** Built a searchable archive of communications and used AI tools to generate an FAQ, reducing admin burden and improving user experience.
- **Workflow Modernization:** Eliminated redundancy by transitioning from Formstack applications to LSU's HR system, streamlining candidate intake and documentation.

Webpage: [LSU Virtual Math Circle \(VMC\)](#)

Head Supervisor

LSU - College of Engineering

May 2020 – Present (Seasonal) Baton Rouge, LA / Atlanta, GA

**Summary:** Direct summer operations for the Bridge to Engineering Excellence (BEE) Program, a flagship initiative of LSU's College of Engineering. Manage staff, training, ed-tech infrastructure, and curriculum design to enhance student readiness, streamline workflows, and reduce operational overhead through automation and system upgrades.

- **Team Management & Training:** Supervised and trained graduate assistants; led onboarding sessions covering remote instruction, curriculum flow, and technical tools (e.g., Moodle, Zoom, GoodNotes).
- **Instructional Leadership:** Delivered Calculus instruction and oversaw the curriculum to prepare students for LSU's engineering program.
- **Automation & Efficiency:** Negotiated university-discounted WeBAssign access and implemented automated grading workflows, significantly reducing manual labor.
- **Ed-Tech Procurement:** Coordinated with Cengage to ensure timely platform access for all students; streamlined digital resource deployment across the program.

EDUCATION

Ph.D. in Mathematics

Baylor University

Aug 2019 Waco, TX

**Thesis:** *On Birman–Hardy–Rellich-type Inequalities*

**Advisor:** Fritz Gesztesy

**Co-Advisor:** Lance Littlejohn

**GPA:** 4.0

M. of Applied Statistics

Louisiana State University

May 2023 Baton Rouge, LA

**Advisor:** Kevin McCarter

**GPA:** 4.0

M.S. in Mathematics

Baylor University

Dec 2015 Waco, TX

**GPA:** 4.0

B.S. in Mathematics

Tarleton State University

Aug 2013 Stephenville, TX

**GPA:** 3.3; **Institutional GPA:** 3.9

TECHNICAL SKILLS

Statistical Analysis & Modeling

SAS

R

Python

SQL

Time Series (ARIMA)

Additional: CHAID, K-Means, TensorFlow, scikit-learn, PySpark

AI, Machine Learning & Automation

ChatGPT (GenAI)

BigQuery / Gemini

Databricks

TensorFlow

VBA & Automation

SPSS / SUDAAN

Basic: Docker, GitHub Actions

- **Program Operations:** Directed curriculum pacing, daily schedules, and instructional consistency across instructors to ensure high-quality delivery.

Webpage: [LSU Bridge to Engineering Excellence \(BEE\)](#)

## Mathematical Statistician

### U.S. Census Bureau - Decennial Statistical Studies Division

📅 Aug 2022 – Jun 2023

📍 Baton Rouge, LA

**Summary:** Contributed to the design and optimization of large-scale federal data systems, emphasizing statistical rigor, operational efficiency, and data-driven insight. Led initiatives in sampling design, automation, and infrastructure scaling—improving accuracy, reproducibility, and decision support for national programs.

- **Survey Design & Census Research:** Developed national sampling frameworks and estimation models; led analyses of undercounted populations by race, SES, and household structure; supported insights into U.S. housing and migration trends during the COVID-19 era.
- **Large-Scale Data Engineering:** Streamlined population-level data pipelines using SQL, DBVisualizer, and Amazon Redshift, enabling scalable, efficient analytics across nationwide survey datasets.
- **Statistical Review & Interagency Collaboration:** Reviewed technical publications for methodological soundness and policy compliance; delivered validated, actionable insights to interagency stakeholders supporting public-use data products.

## Postdoctoral Researcher

### LSU - Department of Mathematics

📅 Jun 2019 – Aug 2022

📍 Baton Rouge, LA

**Summary:** Led original research in differential equations, spectral theory, and operator theory, applying advanced mathematical modeling to complex systems. Collaborated with international researchers, delivered presentations at major conferences, and published in peer-reviewed journals—demonstrating high-level analytical rigor and cross-institutional teamwork.

- **Advanced Quantitative Research:** Published peer-reviewed studies on integral inequalities, spectral theory, and operator dynamics with real-world applications in physics and differential systems.
- **Collaboration & Thought Leadership:** Partnered with global scholars in theoretical analysis; presented technical findings across academic conferences and internal research colloquia.
- **Instruction & Communication:** Taught university-level math and theoretical statistics, consistently earning high marks for clarity, engagement, and subject mastery.

## CONSULTING & ADVISORY

### Statistical Consultant

#### Virginia Department of Health

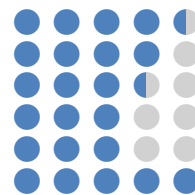
📅 Oct 2024

📍 Atlanta, GA

**Summary:** Provided statistical consulting and data analysis for the Comprehensive Harm Reduction (CHR) Program, evaluating effectiveness and automating survey reporting for data-driven decision-making.

## Cloud & Business Intelligence

Google Cloud (GCP)  
Amazon Redshift  
Tableau  
Power BI  
SAP BusinessObjects  
SharePoint



## Programming Tools & IDEs

LaTeX, Git, GitHub, RStudio, SAS Studio, Google Colab, DBVisualizer, Overleaf

*Also familiar with: Mathematica, Matlab, Maple*

## Business & Productivity Systems

Microsoft 365, Google Workspace (Docs, Drive, Forms, Meet, Chat), QuickBooks, Excel for Finance, Google Sheets (advanced)

*Additional: Workday, Formstack, Asana, MyEmma (mass email campaigns), NextSource (vendor management)*

## GRANTS & FUNDING

### AMS Epsilon Young Scholars Program Grant

#### American Mathematical Society

📅 2022 – Present

Awarded annually to support the LSU Virtual Math Circle, a national STEM outreach initiative for mathematically talented high school students.

- Secured competitive annual funding across four grant cycles (2022–2025).
- Generated remaining external revenue through direct payments from families, fully sustaining the program without institutional LSU funding.

### Graduate Student Travel Awards

#### Baylor University

📅 2017–2018

Funded travel and lodging for invited speaker presentations at major mathematics conferences:

- SIAM Texas-Louisiana Section Meeting, Baton Rouge, LA (2018)
- Ohio River Analysis Meeting, Lexington, KY (2018)

- **Survey Data Processing & Automation:** Cleaned and standardized multi-wave survey data; developed SAS macros to automate cross-tabulations, summary statistics, and custom visualizations.
- **Stakeholder Reporting:** Co-authored a comprehensive 100-page evaluation report summarizing client demographics, behavioral outcomes, and program satisfaction across subgroups.
- **Analytic Strategy Support:** Provided guidance on interpretation of key metrics, 3D visualization design, and reporting frameworks for public health planning and grant applications.

## Research Mentor

### CDC - Statistical Advisory Group

📅 Oct 2023 – Jun 2024      📍 Atlanta, GA

**Summary:** Provided statistical mentorship to CDC researchers through the Statistical Advisory Group (SAG) Mentorship Program. Advanced maternal and child health research priorities by delivering applied training, guiding model development, and supporting manuscript production.

- **Technical Training:** Taught mentees statistical techniques including hypothesis testing, regularized regression, classification modeling, and structural equation modeling (SEM).
- **Research Strategy & Leadership:** Led biweekly sessions to refine analysis plans, strengthen data pipelines, and advise on interpretation for evidence-based decision-making.
- **Collaborative Output:** Co-authored a CDC study on hand hygiene in Uganda during COVID-19, contributing to model design and modified Poisson regression analysis.

## Statistical Review & Advisory Panels

### CDC - Objective Review Panel

📅 Jun 2023 – Dec 2024      📍 Atlanta, GA

- **Public Health Reports Review (2024):** Assessed manuscript on COVID-19 excess mortality; verified p-values, CIs, and modeling assumptions for statistical validity.
- **Data Modernization Oversight (2024):** Reviewed SAS-to-R migration for output consistency, QA logic, and validation test coverage.
- **Maternal Mental Health Study (2023):** Evaluated stratification, imputation methods, and adjusted regression outputs; identified subgroup analysis issues.
- **Federal Grant Review Panelist (2023):** Assessed statistical methodology in NOFO applications; evaluated design clarity, sampling strategy, and analysis plans.

## TRAINING & DEVELOPMENT

### Technical Upskilling & Online Trainings

#### Various Providers (Udacity, Databricks, Google, etc.)

📅 May 2025 – Jun 2025      📍 Atlanta, GA

Pursued executive-level fluency in AI, automation, and data infrastructure to support strategic decision-making and financial innovation.

- **TensorFlow for Deep Learning (Udacity):** Developed and deployed neural networks, including CNNs, for forecasting and automation.
- **Advanced MLOps (Databricks Academy):** Studied ML lifecycle, MLOps strategy, and model scalability on enterprise-grade platforms.

- International Workshop on Operator Theory and Applications (IWOTA), Chemnitz, Germany (2017)
- Joint Mathematics Meetings (JMM), Atlanta, GA (2017)

## MSRI Summer School Fellowship

### Mathematical Sciences Research Institute (MSRI)

📅 2016, 2018

Received competitive funding to participate in specialized mathematics summer research programs:

- *The  $\partial$ -Problem in the 21st Century* (2018)
- *An Introduction to Character Theory and the McKay Conjecture* (2016)

## STRENGTHS

- AI & Automation
- Workflow Optimization
- Statistical Programming (SAS, R, Python)
- Operational Leadership
- Financial Strategy
- Data-Driven Decision Making
- Enterprise Data Strategy
- Budgeting & Forecasting
- Data Governance
- Scientific Communication

## REFERENCES

### Lee Warner, PhD

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Former Branch Chief  
Women's Health and Fertility Branch  
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### Cynthia Cassell, PhD

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Former Senior Team Lead  
PRAMS Team  
Women's Health and Fertility Branch  
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- **Scikit-learn Foundations (Great Learning):** Practiced building predictive models in Python—classification, regression, and clustering.
- **Google Gemini + BigQuery ML (Google Cloud):** Used Duet AI to generate SQL queries, run forecasts in BigQuery ML, and accelerate business intelligence workflows.
- **Data Pipelines with Delta Live Tables (Databricks Academy):** Designed scalable ETL pipelines using Delta Live Tables, Spark SQL, and Python within the Medallion architecture.

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## Data Weighting System Training

### CDC - Division of Reproductive Health

📅 Nov 2023 – Feb 2024

📍 Atlanta, GA

Completed multi-month training in CDC's PRAMS data weighting infrastructure, emphasizing automation, quality assurance, and reproducibility. Applied advanced SAS systems to verify and process population-level datasets, building scalable workflows for reporting and bias correction. Gained expertise in systemic validation, exception handling, and producing audit-ready, high-integrity data products.

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## Sampling Verification Training

### CDC - Division of Reproductive Health

📅 Oct 2023

📍 Atlanta, GA

Completed CDC training on PRAMS sampling verification, focusing on quality assurance, stratification logic, and integrity across state-reported submissions. Applied statistical tests and ratio class adjustments to validate sampling rates and support audit-ready documentation.

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## Data Visualization Using SAS ODS Graphics

### Statistical Analysis System (SAS)

📅 Sept 2023

📍 Atlanta, GA

Six-day course on designing effective, high-quality data visualizations using SAS ODS Graphics.

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## Introduction to Survey Sampling

### U.S. Census Bureau

📅 Dec 2022

📍 Baton Rouge, LA

Three-day intensive on survey design and methodology, covering estimation theory and sampling techniques, including simple random, stratified, and cluster sampling.

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# STRATEGIC LEADERSHIP & ENGAGEMENTS

## PRAMS National Grantee Meeting

### CDC - Division of Reproductive Health

📅 Sept 2024

📍 Seattle, WA

Delivered on-site statistical consulting and technical guidance at the CDC's two-day flagship PRAMS conference, supporting state epidemiologists and data managers across the nation.

- Guided site teams through complex stratification logic, sampling fraction verification, and mis-stratification resolution.
- Delivered technical support on birth certificate linkage, sampling design, and SAS-based automation protocols.

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## Holly Shulman, MS

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- Led open Q&A sessions, offering real-time troubleshooting and workflow optimization across diverse site contexts.

## Alabama PRAMS Site Visit

### Alabama Department of Public Health

📅 Sept 2023

📍 Montgomery, AL

Led a two-day onsite consultation to enhance the Alabama PRAMS team's analytic capacity and data processing workflows.

- Delivered targeted SAS training on weighted frequencies, cross-tabulations, and summary statistics using CDC standard templates.
- Audited data integration and documentation practices; recommended improvements to quality, reproducibility, and efficiency.

## PRAMS Team Retreat - Strategic Planning Session

### CDC - Division of Reproductive Health

📅 Aug 2023

📍 Atlanta, GA

Participated in high-level strategic planning during a two-day retreat to define PRAMS program priorities and modernize operational frameworks for the 2024 cycle.

- Co-developed the framework to eliminate the longstanding 50% response rate threshold, clarifying timing, rationale, and national implementation logistics.
- Proposed streamlined policies and strategies to improve data governance and operational efficiency.

## LSU Discover Day - Undergraduate Research Conference

### LSU - Gordon A Cain Center for STEM Literacy

📅 Apr 2023, 2025

📍 Baton Rouge, LA

Directed logistical and operational planning for LSU Virtual Math Circle (VMC) student participation in a two-day university-wide research conference, aligning outreach with institutional recruitment strategy.

- Oversaw end-to-end event coordination, including registration workflows, travel logistics, and day-of scheduling.
- Managed on-site operations to ensure professional delivery of student research presentations and speaker engagement.
- Led campus engagement efforts in partnership with LSU's Department of Mathematics to drive visibility and enrollment.

## PROFESSIONAL PRESENTATIONS

## Data Weighting Issues Overview for PRAMS Sites

### CDC - Division of Reproductive Health

📅 Apr 29, 2024

📍 Atlanta, GA

- Delivered a national presentation to 50 PRAMS grantee sites addressing systemic data weighting issues and mitigation strategies for the 2022 birth cohort.
- Highlighted key challenges such as sampling fraction errors, mis-stratification, birth file mismatches, and PII handling risks.
- Recommended actionable improvements for site-level documentation, data validation processes, and compliance with CDC protocols.

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## Lectures on Mathematical Analysis & Operator Theory

**IWOTA, JMM, SIAM, and Academic Colloquia**

📅 2015–2022

📍 U.S. and International

- Delivered over 17 peer-reviewed research talks on spectral theory, Rellich-type inequalities, and functional analysis at international mathematics conferences.
  - Featured as an invited speaker at the International Workshop on Operator Theory and Applications (IWOTA), Joint Mathematics Meetings (JMM), Society for Industrial and Applied Mathematics (SIAM), and various university colloquia.
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## PUBLICATIONS

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### 📄 Journal Articles

- **I. B. Michael**, F. Gesztesy, L. Littlejohn, and M. M. H. Pang, “Extended Power Weighted Rellich-Type Inequalities with Logarithmic Refinements,” *Yokohama Publishers*, vol. 9, no. 1, pp. 69–91, 2024.
  - **I. B. Michael**, D. Quan, and E. Gollub, “Preliminary Validation of Digital Photography to Assess the Home Food Environment,” *European Journal of Investigation in Health, Psychology, and Education*, vol. 13, no. 7, pp. 1257–1268, 2023.
  - **I. B. Michael**, F. Gesztesy, L. Littlejohn, and M. M. H. Pang, “A Sequence of Weighted Birman–Hardy–Rellich-type Inequalities with Logarithmic Refinements,” *Integral Equations and Operator Theory*, vol. 94, no. 13, 2022.
  - **I. B. Michael**, F. Gesztesy, and M. M. H. Pang, “Optimality of Constants in Weighted Birman–Hardy–Rellich Inequalities with Logarithmic Refinements,” *CUBO, A Mathematical Journal*, vol. 24, no. 1, pp. 115–165, 2022.
  - **I. B. Michael**, C. Y. Chuah, F. Gesztesy, L. Littlejohn, T. Mei, and M. M. H. Pang, “On Weighted Hardy-Type Inequalities,” *Mathematical Inequalities and Applications*, vol. 23, no. 2, pp. 625–646, 2020.
  - **I. B. Michael**, F. Gesztesy, L. Littlejohn, and M. M. H. Pang, “Radial and Logarithmic Refinements of Hardy’s Inequality,” *St. Petersburg Math. J.*, vol. 30, pp. 429–436, 2019.
  - **I. B. Michael**, F. Gesztesy, L. Littlejohn, and R. Wellman, “On Birman’s Sequence of Hardy–Rellich-Type Inequalities,” *Journal of Differential Equations*, vol. 264, no. 4, pp. 2761–2801, 2018.
  - **I. B. Michael** and M. Sepanski, “Net Regular Signed Trees,” *Australasian Journal of Combinatorics*, vol. 66, no. 2, pp. 192–204, 2016.
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### 👥 Conference Proceedings

- **I. B. Michael**, S. Jones, and E. Melvin, “Online Engineering Bridge Summer Program Created and Focused on Preparing Students for Calculus,” in *2023 ASEE Annual Conference & Exposition*, 2023.
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### 📖 Book Chapters

- **I. B. Michael**, F. Gesztesy, and M. M. H. Pang, “A New Proof of the Power Weighted Birman–Hardy–Rellich Inequalities,” in *Operator and Norm Inequalities and Related Topics*, ser. Trends in Mathematics, R. M. Aron, M. S. Moslehian, I. M. Spitkovsky, and H. J. Woerdeman, Eds., Birkhäuser, Springer, Cham, 2022, pp. 577–600.
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