Isaac B. Michael

Curriculum Vitae

Education

Exp. 2023   **M.S. in App. Statistics**, *Louisiana State University*, Baton Rouge, LA.
Advisor: Kevin McCarter

2019   **Ph.D. in Mathematics**, *Baylor University*, Waco, TX.
Advisor: Fritz Gesztesy   Co-Advisor: Lance Littlejohn
Thesis: *On Birman–Hardy–Rellich-type Inequalities*

2015   **M.S. in Mathematics**, *Baylor University*, Waco, TX.
4.0 GPA

2013   **B.S. in Mathematics**, *Tarleton State University*, Stephenville, TX.
3.3 GPA; 3.9 Institutional GPA
8-12 Math Teaching Certification

Research Interests

Primary   Statistical Inference, Experimental Statistics, Nonparametric Statistics, Analysis (Real, Complex, and Functional), Differential Equations (Ordinary and Partial), Spectral Theory, Operator Theory

Secondary   Deterministic Dynamical Systems, Semigroups, Functional Calculus, Calculus of Variations, Lie Theory

Publications and Preprints

[1] *Net Regular Signed Trees*, with M. Sepanski, Australasian Journal of Combinatorics **66(2)**, 192-204 (2016).

[2] *On Birman's Sequence of Hardy–Rellich-Type Inequalities*, with F. Gesztesy, L. Littlejohn, and R. Wellman, Journal of Differential Equations **264(4)**, 2761-2801 (2018).

[3] *Radial and Logarithmic Refinements of Hardy's Inequality*, with F. Gesztesy, L. Littlejohn, and M. M. H. Pang, Algebra i Analiz, **30(3)**, 55–65 (2018) (Russian), St. Petersburg Math. J., St. **30**, 429–436 (2019) (English).

[4] *On Weighted Hardy-Type Inequalities*, with C. Y. Chuah, F. Gesztesy, L. Littlejohn, T. Mei, and M. M. H. Pang, Math. Ineq. & App. **23(2)**, 625-646 (2020).

Louisiana State University – Department of Mathematics
✆ *(254) 366-6861* • ✉ *imichael@lsu.edu*
🖥 *math.lsu.edu/~imichael*   *1/11*

[5] *A Sequence of Weighted Birman–Hardy–Rellich-type Inequalities with Logarithmic Refinements*, with F. Gesztesy, L. Littlejohn, and M. M. H. Pang, Integral Eq. Operator Theory **94**, No. 13 (2022), 38pp.

[6] *Optimality of Constants in Weighted Birman–Hardy–Rellich Inequalities with Logarithmic Refinements*, with F. Gesztesy, and M. M. H. Pang, CUBO, A Math. J. **24**, No. 1, 115–165 (2022).

[7] *A New Proof of the Weighted Birman–Hardy–Rellich Inequalities*, with F. Gesztesy, and M. M. H. Pang (soon to appear).

[8] *Rellich Inequality in $B(0, R) \subseteq \mathbb{R}^n, n \geq 2$*, with F. Gesztesy, and M. M. H. Pang (in progress).

[9] *Multidimensional Weighted Birman–Hardy–Rellich-type Inequalities with Radial and Logarithmic Refinements*, with F. Gesztesy, L. Littlejohn, and M. M. H. Pang (in progress).

[10] *Operator Splitting for Non-Linear Evolution Equations*, with F. Neubrander, R. Gilman, and K. Özer (in progress).

Work Experience

2019-Present   **Postdoctoral Researcher**, LOUISIANA STATE UNIVERSITY, Baton Rouge, LA.

Research: Conducted and published mathematical research in collaboration with a team of analysts in the fields of Analysis, Functional Analysis, Ordinary and Partial Differential Equations, Operator Theory, and Spectral Theory.

Teaching: Taught a minimum of 7 credit hours of mathematics courses each academic year, handling all student interactions, preparing all material for lectures, preparing syllabi, quizzes/exams, and assigning all grades.

Courses Taught
Summer 2022   MTH 6893 - Seminar in Mathematics (Online)
Fall 2021   MTH 4056 - Mathematical Statistics
Spring 2021   MTH 1552 - Analytic Geometry and Calculus II (Online)
              MTH 4999 - Math Seminar (Online)
Fall 2020   MTH 4056 - Mathematical Statistics (Online)
Fall 2019   MTH 1550 - Analytic Geometry and Calculus I
              MTH 4999 - Math Seminar
Summer 2019   MTH 2020 - LSU STEM Certification Pathways

Programs Created, Supervised, & Taught
Summer 2022   LSU Summer Scholars (Online)
              LSU Math Circle (Online)
Spring 2022   EXCELD MTH 1550 Bootcamp (Online)

Louisiana State University – Department of Mathematics
✆ *(254) 366-6861*   •   ✉ *imichael@lsu.edu*
⌂ *math.lsu.edu/∼imichael*   *2/11*

Summer 2021 LSU Summer Scholars (Online)
　　　　　　　LSU Math Circle (Online)
Spring 2021 　EXCELD MTH 1550 Bootcamp (Online)
Summer 2020 LSU Summer Scholars (Online)

2015-2019 **Graduate Fellow**, BAYLOR UNIVERSITY, Waco, TX.
Research: Conducted and published mathematical research in collaboration with a team of mathematicians in the fields of Graph Theory and Combinatorics, and more recently Analysis, Functional Analysis, Ordinary and Partial Differential Equations, Operator Theory, and Spectral Theory.

Teaching: Taught one 3-credit-hour mathematics course each semester, handling all student interactions, preparing all material for lectures, preparing syllabi, quizzes/exams, and assigning all grades.

Spring 2019 　MTH 1309 - Business Calculus
Fall 2018 　　MTH 1321 - Calculus I
Spring 2018 　MTH 1309 - Business Calculus
Fall 2017 　　MTH 1320 - Precalculus
Spring 2017 　MTH 1309 - Business Calculus
Fall 2016 　　MTH 1320 - Precalculus
Spring 2016 　MTH 1320 - Precalculus
Fall 2015 　　MTH 1320 - Precalculus

2014-2015 **Graduate Teaching Assistant**, BAYLOR UNIVERSITY, Waco, TX.
Tutored undergraduates in Tutoring Lab and graded for professors.

Courses: Business Precalculus/Calculus, Precalculus, Calculus I, II, & III, Differential Equations, Probability and Statistics, and Advanced Calculus

2013-2014 **Mathematics Teacher**, REICHER CATHOLIC HIGH SCHOOL, Waco, TX.
Taught 9-12th-grade mathematics courses. Handled all student interactions, prepared all material for lectures, prepared syllabi, quizzes/exams, and assigned all grades.

Courses: Geometry (Honors), Algebra II (Honors), Contemporary Mathematics, and AP Calculus I

2011-2013 **Mathematics Tutor**, TARLETON STATE UNIVERSITY, Stephenville, TX.
Tutored undergraduates in Tutoring Lab.

Courses: Business Precalculus, Business Calculus, Precalculus, Geometry, Calculus I, II, & III, and Probability and Statistics

2011-2019 **Private Tutor**, Waco, TX & Stephenville, TX.
Tutoring undergraduates in various mathematics courses.

Courses: Algebra, Geometry, Precalculus, Calculus I, II, & III, Probability and Statistics, Business Calculus, Advanced Analysis

Louisiana State University – Department of Mathematics
📞 *(254) 366-6861* • ✉ *imichael@lsu.edu*
🖥 *math.lsu.edu/~imichael*　　　　　　　　*3/11*

Professional Development

Summer 2022 **LSU Math Circle Program (Online)**; Head Instructor; *LSU Gordon A. Cain Center*;
Louisiana State University; Baton Rouge, LA.

Head instructor in charge of expanding, organizing, coordinating, and instructing a three-week summer online program designed to provide high school students with the opportunity to conduct mathematical research.

Responsibilities included: grant application, recruitment, program advertisement, webpage language & design, employment application language & design, program planning, supervisory meetings, research proposals, interviewing & hiring.

Webpage: LSU Math Circle: High School Math Research Program

LSU Summer Scholars Program (Online); *LSU College of Engineering*;
Louisiana State University; Baton Rouge, LA.

Planned, organized, coordinated, developed, and instructed a six-week, introductory summer online program designed for incoming LSU engineering students to prepare for college-level mathematics courses.

Webpage: LSU Summer Scholars Program

Summer 2021 **LSU Math Circle Program (Online)**; Head Instructor; *LSU Gordon A. Cain Center*;
Louisiana State University; Baton Rouge, LA.

Head instructor in charge of organizing, coordinating, and instructing a three-week summer online program designed to provide high school students with the opportunity to conduct mathematical research.

Webpage: LSU Pre-College Virtual Program

LSU Summer Scholars Program (Online); *LSU College of Engineering*;
Louisiana State University; Baton Rouge, LA.

Planned, organized, coordinated, developed, and instructed a six-week, introductory summer online program designed for incoming LSU engineering students to prepare for college-level mathematics courses.

Summer 2020 **LSU Summer Scholars Program (Online)**; *LSU College of Engineering*;
Louisiana State University; Baton Rouge, LA.

Planned, organized, coordinated, developed, and instructed a six-week, introductory summer online program designed for incoming LSU engineering students to prepare for college-level mathematics courses.

LSU Virtual Math Institute; *Gordon A. Cain Center*;
Louisiana State University; Baton Rouge, LA.

Louisiana State University – Department of Mathematics
📞 *(254) 366-6861* • ✉ *imichael@lsu.edu*
🖥 *math.lsu.edu/~imichael* *4/11*

Assisted with the planning, organization, and development of an online-based workshop created in partnership with the New Jersey Center for Teaching and Learning for middle school or high school mathematics teachers looking to pass the Louisiana Praxis exams.

Webpage: LSU Virtual Math Institute

Summer 2019 **LSU STEM Certification Pathways**; *Summer Training Institute*; Louisiana State University; Baton Rouge, LA.

Instructed high school teachers for six weeks in LSU STEM Certification Pathway courses.

Session 1: Module 1 (Algebra) 8:00 AM-1:00 PM
Module 2 (Geometry) 1:30 PM-4:30 PM

Session 2: Module 3 (Statistics) 8:00 AM-1:00 PM
Module 4 (Calculus) 1:30 PM-4:30 PM

Spring 2017 **Seminars for Excellence in Teaching**; Baylor University; Waco, TX.

Participated in five university-sponsored teaching seminars designed to further professional development through discussion and exposure to interactive teaching methods, lesson planning, objective-oriented course outlines, technology for supplemental instruction, flipped classrooms, and adjustments for at-risk students.

Invited Presentations

May 2022 *Optimality of the Birman–Hardy–Rellich-type Inequalities*; Baylor Analysis Fest, Baylor University; Waco, TX.

Mar. 2022 *Optimality of the Birman–Hardy–Rellich-type Inequalities*; Spectral Theory of Ergodic Quantum Systems, Louisiana State University; Baton Rouge, LA.

Mar. 2022 *Lifshitz Tails*; Applied Analysis Seminar, Louisiana State University; Baton Rouge, LA.

Sept. 2019 *Weighted Birman–Hardy–Rellich-type Inequalities with Refinements*; Applied Analysis Seminar, Louisiana State University; Baton Rouge, LA.

Aug. 2019 *On Birman–Hardy–Rellich-type Inequalities with Logarithmic Refinements*; Dissertation Defense, Baylor University; Waco, TX.

May 2019 *Power Weighted Birman–Hardy–Rellich-type Inequalities with Logarithmic Refinements via Hartman–Mueller-Pfeiffer Transformations*; Informal Analysis Seminar, Baylor University; Waco, TX.

Oct. 2018 *Birman–Hardy–Rellich-type Inequalities and Refinements*; Contributed Talk, Texas Analysis and Mathematical Physics Symposium, Baylor University; Waco, TX.

Louisiana State University – Department of Mathematics
🕿 *(254) 366-6861* • ✉ *imichael@lsu.edu*
🖳 *math.lsu.edu/∼imichael*   *5/11*

Oct. 2018	*Birman–Hardy–Rellich-type Inequalities and Refinements*; Contributed Talk, Texas-Louisiana SIAM Meeting, Louisiana State University; Baton Rouge, LA.
June 2018	*Tangential Cauchy-Riemann Equations*; joint talk with T. Alexander and E. Addison, MSRI Summer Graduate School, Mathematical Sciences Research Institute; Berkeley, CA.
Apr. 2018	*Birman's Sequence of Hardy–Rellich-type Inequalities and Linear Operators with Continuous Spectra*; Math Club Meeting, Tarleton State University; Stephenville, TX.
Mar. 2018	*Birman–Hardy–Rellich-type Inequalities and Refinements*; Contributed Talk, Ohio River Analysis Meeting, University of Kentucky; Lexington, KY.
Mar. 2018	*Birman–Hardy–Rellich-type Inequalities and Refinements*; Mini-symposium, Baylor Chapter AMS, Baylor University; Waco, TX.
Nov. 2017	*Birman's Sequence of Inequalities and Generalized Continuous Cesàro Operators*; Brazos Analysis Seminar, University of Houston; Houston, TX.
Oct. 2017	*Birman's Sequence of Inequalities and Generalized Continuous Cesàro Operators*; Analysis Seminar, Baylor University; Waco, TX.
Aug. 2017	*On Birman's Sequence of Hardy–Rellich-Type Inequalities*; Contributed Talk, International Workshop on Operator Theory and its Applications, Technische Universität; Chemnitz, Germany.
Mar. 2017	*On Birman's Sequence of Inequalities*; Mini-symposium, Baylor Chapter AMS, Baylor University; Waco, TX.
Jan. 2017	*Net Regular Signed Trees*; AMS Contributed Paper Session, Joint Mathematics Meeting; Atlanta, GA.

Conferences, Workshops, and Seminars

May 2022	**Baylor Analysis Fest**; Baylor University; Waco, TX.
Mar. 2022	**Spectral Theory of Ergodic Quantum Systems**; Louisiana State University; Baton Rouge, LA.
Oct. 2018	**Texas Analysis and Mathematical Physics Symposium**; Baylor University; Waco, TX.
Oct. 2018	**Texas-Louisiana SIAM Meeting**; Louisiana State University; Baton Rouge, LA.
Sept. 2018	**Brazos Analysis Seminar**; Texas A&M University; College Station, TX.
June 2018	**MSRI Summer Graduate School**; *The ∂-Problem in the Twenty-First Century*, Mathematical Sciences Research Institute; Berkeley, CA.
Mar. 2018	**Ohio River Analysis Meeting**; University of Kentucky; Lexington, KY.
Nov. 2017	**Brazos Analysis Seminar**; University of Houston; Houston, TX.

Louisiana State University – Department of Mathematics
✆ *(254) 366-6861* • ✉ *imichael@lsu.edu*
🖳 *math.lsu.edu/~imichael* 6/11

Aug. 2017	**International Workshop on Operator Theory and its Applications**; Technische Universität; Chemnitz, Germany.
Jan. 2017	**Joint Mathematics Meeting**; Atlanta, GA.
July 2016	**MSRI Summer Graduate School**; *An Introduction to Character Theory and the McKay Conjecture*, Mathematical Sciences Research Institute; Berkeley, CA.

Awards and Honors

2014-2019	**Graduate Student Fellowship**, *Baylor University*, Waco, TX. Graduate student full tuition funding from the graduate school for outstanding students.
June 2018	**Accepted to participate in MSRI Graduate Summer School**, *Mathematical Sciences Research Institute*, Berkeley, CA. Chosen by the Baylor University Mathematics Department to attend MSRI Graduate Summer School, *The ∂-Problem in the Twenty-First Century*.
July 2016	**Accepted to participate in MSRI Graduate Summer School**, *Mathematical Sciences Research Institute*, Berkeley, CA. Chosen by the Baylor University Mathematics Department to attend MSRI Graduate Summer School, *An Introduction to Character Theory and the McKay Conjecture*.

Grants and Funding

Mar. 2022	**AMS Epsilon Fund Grants for Young Scholars**, *American Mathematical Society (AMS)*, *LSU Math Circle: High School Math Research Program*. Amount: $2,500 This grant was used to provide $500 partial scholarships to five high school students participating in the LSU Math Circle summer program.
Oct. 2018	**Graduate Student Travel Award**, *Baylor University*, *Birman–Hardy–Rellich-type Inequalities and Refinements*. This award assisted with travel and lodging for the SIAM Texas-Louisiana Meeting in Baton Rouge, LA. Traveled as an invited speaker.
June 2018	**MSRI Graduate Summer School Funding**, *Mathematical Sciences Research Institute*, *The ∂-Problem in the Twenty-First Century*. This award assisted with travel and lodging for MSRI Graduate Summer School in Berkeley, California. Traveled as a graduate student.

Louisiana State University – Department of Mathematics
🕾 *(254) 366-6861* • ✉ *imichael@lsu.edu*
🖥 *math.lsu.edu/~imichael*   *7/11*

Mar. 2018	**Graduate Student Travel Award**, *Baylor University*, *Birman–Hardy–Rellich-type Inequalities and Refinements*.
	This award assisted with travel and lodging for the Ohio River Analysis Meeting in Lexington, Kentucky. Traveled as an invited speaker.
Aug. 2017	**Graduate Student Travel Award**, *Baylor University*, *On Birman's Sequence of Hardy–Rellich-type Inequalities*.
	This award assisted with travel and lodging for the International Workshop on Operator Theory and its Applications in Chemnitz, Germany. Traveled as an invited speaker.
Jan. 2017	**Graduate Student Travel Award**, *Baylor University*, *Net Regular Signed Trees*.
	This award assisted with travel and lodging for the Joint Mathematics Meeting in Atlanta, Georgia. Traveled as an invited speaker and chair for the AMS Contributed Paper Session.
July 2016	**MSRI Graduate Summer School Funding**, *Mathematical Sciences Research Institute*, *An Introduction to Character Theory and the McKay Conjecture*.
	This award assisted with travel and lodging for MSRI Graduate Summer School in Berkeley, California. Traveled as a graduate student.

▬▬▬ Technical Skills

Programming	LaTex (including Beamer), Python, R, SAS, VBA, C#, Java, and HTML (basic)
Applications	Matlab, Maple, and Mathematica
OS	Windows, Mac, and Linux (basic)
Educational	WebAssign, Blackboard, Canvas, and Moodle
Other	Microsoft (Word, Outlook, Excel, PowerPoint)/Open Office Suite plus add-ons

▬▬▬ Memberships

- Institute of Mathematical Statistics (IMS)
- Society for Industrial and Applied Mathematics (SIAM)
- American Mathematical Society (AMS)
- Mathematical Association of America (MAA)

Louisiana State University – Department of Mathematics
(254) 366-6861 • *imichael@lsu.edu*
math.lsu.edu/~imichael   *8/11*

Undergraduate Coursework (Selected)

- Foundations of Engineering I, II
- Probability and Statistics I, II
- Calculus I, II, & III
- Number Theory with Applications to Cryptology
- Applied Matrix Algebra
- Advanced Analysis
- Linear Algebra
- Abstract Algebra
- Discrete Mathematics
- Technical Writing and Document Design
- C# Programming

Graduate Coursework

- Advanced Calculus I, II
- Abstract Algebra I, II
- Topology
- Algebraic Topology
- Real Analysis I, II
- Complex Analysis
- Distribution Theory I, II
- Operator and Spectral Theory I, II
- Differential Geometry
- Graph Theory
- Rings
- Additive Combinatorics
- Compact Lie Groups
- Riemann Surfaces
- ODE Theory
- Functional Analysis
- Lie Theory
- Potential Theory
- PDE Theory
- Calculus of Variations
- Statistical Inference
- Probability and Statistics
- Statistical Theory
- Experimental Statistics II
- Nonparametric Statistics

Knowledge, Skills, and Abilities

Knowledge, skills, and abilities of professional statistical work such as (a) sampling, (b) collecting, computing, and analyzing statistical data, and (c) applying statistical techniques such as measurement of central tendency, dispersion, skewness, sampling error, simple and multiple correlation, analysis of variance, and tests of significance.

Experience planning, organizing, and directing development efforts and conducting data analysis, and designing algorithms using artificial intelligence methods.

Knowledge of statistical methods to conduct statistical analyses; preparing technical reports and professional papers on social/economic or demographic survey data; developing sample design; establishing survey specifications and methodology; documenting analyses and conclusions in written and oral reports.

Knowledge of data analysis techniques such as text mining, word cloud, statistical significance, correlations, and regression analysis to develop metric tracking systems, and interactive dashboards.

Knowledge of business analytic software such as Excel, OneDrive, Hyperion Data-Mart, SAP Business Objects, and Tableau to solve operational and business process challenges.

Citizenship and Selective Service

US Citizen   Yes

Selective Service   Registered, Selective Service Number: 89-1323067-1

Louisiana State University – Department of Mathematics
🕾 (254) 366-6861 • ✉ imichael@lsu.edu
🖥 math.lsu.edu/~imichael   *9/11*

References

Fritz Gesztesy
Ralph & Jean Storm Professor of Mathematics
Department of Mathematics
Baylor University
One Bear Place #97328
Waco, TX 76798-7328
Phone: (254) 710-2899
Email: fritz_gesztesy@baylor.edu

Lance Littlejohn
Professor of Mathematics
Department of Mathematics
Baylor University
One Bear Place #97328
Waco, TX 76798-7328
Phone: (254) 710-3943
Email: lance_littlejohn@baylor.edu

Paul Hagelstein
Professor of Mathematics
Department of Mathematics
Baylor University
One Bear Place #97328
Waco, TX 76798-7328
Phone: (254) 710-4879
Email: paul_hagelstein@baylor.edu

Tao Mei
Professor of Mathematics
Department of Mathematics
Baylor University
One Bear Place #97328
Waco, TX 76798-7328
Phone: (254) 710-3229
Email: tao_mei@baylor.edu

Mark Sepanski
Professor of Mathematics & Graduate Program Director
Department of Mathematics
Baylor University
One Bear Place #97328
Waco, TX 76798-7328
Phone: (254) 710-6580
Email: mark_sepanski@baylor.edu

Kevin McCarter
Associate Professor of Statistics
Department of Experimental Statistics
Louisiana State University
171 Woodin Hall
Baton Rouge, LA 70803
Phone: (225) 578-8381
Email: mccarter@lsu.edu

Louisiana State University – Department of Mathematics
🕾 *(254) 366-6861* • ✉ *imichael@lsu.edu*
🖳 *math.lsu.edu/~imichael*   *10/11*

Luis Escobar

Professor of Statistics & Graduate Advisor
Department of Experimental Statistics
Louisiana State University
159A Woodin Hall
Baton Rouge, LA 70803
Phone: (225) 578-8377
Email: luis@lsu.edu

Frank Neubrander

Demarcus D. Smith Alumni Professor of Mathematics
Department of Mathematics
Louisiana State University
209 Prescott Hall
Baton Rouge, LA 70803
Phone: (225) 578-4522
Email: neubrand@math.lsu.edu

Michael Pang

Professor of Mathematics
Department of Mathematics
University of Missouri
122A Mathematical Sciences Building
Columbia, MO 65211
Phone: (573) 882-0322
Email: pangm@missouri.edu

James Madden

The Patricia Hewlett Bodin Distinguished Professor
Department of Mathematics
Louisiana State University
Prescott Hall 213
Baton Rouge, LA 70803
Phone: (225) 578-7988
Email: madden@math.lsu.edu

Constanze Liaw

Associate Professor of Mathematics
Department of Mathematics
University of Delaware
311 Ewing Hall
Newark, DE 19716
Phone: (302) 831-2694
Email: liaw@udel.edu

Louisiana State University – Department of Mathematics
✆ *(254) 366-6861* • ✉ *imichael@lsu.edu*
🖥 *math.lsu.edu/~imichael*   *11/11*