

William L. Blair

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Employment

Assistant Professor <i>The University of Texas at Tyler</i>	August 2024 – Present Tyler, TX
Graduate Teaching Assistant <i>University of Arkansas</i>	August 2017 – May 2024 Fayetteville, AR

Education

Ph.D. Mathematics. University of Arkansas <i>Thesis: “Generalizations of the Hardy Spaces and the Schwarz Boundary Value Problem”</i> <i>Advisor: Andrew S. Raich</i>	May 2024
M.S. Mathematics. University of Arkansas	December 2020
B.S. Mathematics. Henderson State University <i>Summa Cum Laude. Minor: Computer Science</i>	May 2017
A.S. National Park Community College	December 2014

Research Interests

Generalizations of classical Hardy spaces, generalized analytic functions, generalizations of generalized analytic functions, complex function theory, complex boundary value problems, distributional boundary values, atomic decompositions

Publications

6. “An Atomic Representation for Bicomplex Hardy Classes,” to appear in *Complex Var. Elliptic Equ.*
5. “Meta-analytic functions with derivative not in a Hardy space,” *Ex. Countex.* **7**, 100187 (2025). <https://doi.org/10.1016/j.exco.2025.100187>.
4. “Hardy Spaces of Solutions to Higher-Order Vekua Equations and the Schwarz Boundary Value Problem,” with B. B. Delgado, *J. Geom. Anal.* **35.1**, 13 (2025). <https://doi.org/10.1007/s12220-024-01825-0>
3. “Hardy Spaces of Meta-Analytic Functions and the Schwarz Boundary Value Problem,” *Complex Anal. Synerg.* **10.3**, 13 (2024). <https://doi.org/10.1007/s40627-024-00139-9>.
2. “The Schwarz boundary value problem for boundary values in the sense of distributions,” *J. Math. Anal. Appl.* **530.2**, 127690 (2024). <https://doi.org/10.1016/j.jmaa.2023.127690>
1. “An atomic representation for Hardy classes of solutions to nonhomogeneous Cauchy-Riemann equations,” *J. Geom. Anal.* **33.9**, 307 (2023). <https://doi.org/10.1007/s12220-023-01374-y>

Preprints

“Generalizations of the Dirichlet Boundary Value Problem for Bianalytic Functions,” submitted.

“Bicomplex Hardy Classes of Solutions to Beltrami Equations and the Schwarz Boundary Value Problem,” submitted.

“Generalizations of Poly-Bergman Spaces and the Bitsadze Equation,” with B. B. Delgado, submitted.

“Bicomplex Schwarz and Dirichlet Boundary Value Problems,” submitted.

“An Atomic Representation for Hardy Spaces of Generalized Analytic Functions,” submitted.

“Bicomplex Hardy Classes of Solutions to Higher-Order Vekua Equations,” submitted.

“Existence of Solutions to the Seiberg-Witten Vortex Equations with Exponential Decay on the Plane,” with M. L. Nguyen, submitted.

Teaching Experience

The University of Texas at Tyler

- Introduction to Complex Variables Fall 2025
- Calculus I Summer 2025, Fall 2025
- Real Analysis II Spring 2025
- Real Analysis I Fall 2024
- Math for Business & Economics Fall 2024
- Precalculus Summer 2024, Spring 2025

University of Arkansas

- Mathematical Reasoning in a Quantitative World Spring 2023
- Elementary Differential Equations Summer 2022 - 23
- College Algebra Fall 2018-23, Spring 2022 and 2024, Summer 2021

Conference Invitations/Research Talks

Title TBD

JMM 2026 Special Session on

“Analysis and Differential Equations at Undergraduate Institutions”

*January 2026
Washington, DC, USA*

“An Atomic Representation for Generalized Analytic Functions”

Analysis Seminar, Department of Mathematics, The University of Texas at Tyler

February 2025

Tyler, TX, USA

“Representations by an Atomic Decomposition”

Analysis Seminar, Department of Mathematics, The University of Texas at Tyler

November 2024

Tyler, TX, USA

“The Schwarz Boundary Value Problem”

Analysis Seminar, Department of Mathematics, The University of Texas at Tyler

September 2024

Tyler, TX, USA

“Generalizations of the Hardy Spaces”

Colloquium, Department of Mathematics, The University of Texas at Tyler

September 2024

Tyler, TX, USA

“A New Look at the Schwarz Boundary Value Problem”

- *JMM 2024 Special Session on* January 2024
“Geometric Analysis in Several Complex Variables” San Francisco, CA, USA
- December 2023
- *Graduate Student Colloquium, Dept. of Math. Sci., University of Arkansas* Fayetteville, AR, USA

"An Atomic Representation for Hardy Classes of Solutions to Nonhomogeneous Cauchy-Riemann Equations"

- September 2023
- *Analysis Seminar, Dept. of Mathematics, Washington University in St. Louis* St. Louis, MO, USA
- September 2023
- *Analysis Seminar, Dept. of Math. Sci., University of Arkansas* Fayetteville, AR, USA
- September 2023
- *Graduate Student Colloquium, Dept. of Math. Sci., University of Arkansas* Fayetteville, AR, USA
- August 2023
- *11th Workshop on Geometric Analysis of PDEs and Several Complex Variables,* Serra Negra, SP, Brazil
- July 2023
- *Analysis Seminar, Dept. of Mathematics, Universidade Federal de São Carlos,* São Carlos, SP, Brazil

"Generalizations of the Hardy Spaces"

Graduate Student Colloquium, Department of Math. Sci., University of Arkansas April 2023
Fayetteville, AR, USA

Expository Talks

"Atomic decomposition of holomorphic Hardy spaces on the complex unit disk" October 2021
Graduate Student Colloquium, Department of Math. Sci., University of Arkansas Fayetteville, AR, USA

"Hardy Spaces on \mathbb{R}^n " November 2020
Graduate Student Colloquium, Department of Math. Sci., University of Arkansas Fayetteville, AR, USA

Awards & Honors

Doctoral Student Presentation Travel Grant 2023-24
University of Arkansas

Julia Hicks Endowed Graduate Teaching Award 2021-22, 2023-24
University of Arkansas

Lawrence Jesser Toll Scholarship 2018-19, 2022-23
University of Arkansas

William Alton Anderson Scholarship <i>University of Arkansas</i>	2020-21
John C. Massie Scholarship <i>University of Arkansas</i>	2019-20
Ellis College Outstanding Graduating Senior Award <i>Henderson State University</i>	Spring 2017
William W. Durand Scholarship <i>Henderson State University</i>	2015-16, 2016-17
<i>Service to Mathematics</i>	
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Referee for the following journals: <i>Mathematical Methods in the Applied Sciences</i> <i>Journal of Mathematical Sciences</i>	
Reviewer for Mathematical Reviews (American Mathematical Society)	
<i>Service to the Department of Mathematics, The University of Texas at Tyler</i>	
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Lyceum 2025 <i>Volunteered to judge UT Tyler student research poster presentations.</i>	Spring 2025
Texas Undergraduate Mathematics Conference <i>Volunteered to moderate panel sessions with established faculty members and current doctoral students from a variety of institutions where students had the opportunity to ask questions about pursuing a doctorate degree in mathematics.</i>	Fall 2024
Co-organizer of Analysis Seminar in the Department of Mathematics	2024-Present
Committee Work in the Department of Mathematics at UT Tyler	
<i>Graduate Committee</i>	2024-25
<i>Putnam Exam Committee</i>	2024-25
<i>Service to the Department of Mathematical Sciences, University of Arkansas</i>	
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Arkansas Math Discovery Day <i>Volunteered to present a specific topic and assist event participants in exploring the associated exercises. This event is the successor of the long running annual Celebration of Mind at the University of Arkansas event.</i>	Spring 2024
Graduate Student Colloquium <i>Maintained role of Online Manager. This consisted of constructing and maintaining a website which includes general information about the group and information concerning future and past talks for the Graduate Student Colloquium of the Department of Mathematical Sciences at the University of Arkansas.</i>	Spring 2022 - Spring 2024
UARK Department of Mathematical Sciences Committee for Diversity and Inclusion <i>Participated in the committee as the graduate student member. Communicated my viewpoint on specific issues and assisted in preparing the department's DEI statement.</i>	2019-20
Celebration of Mind at the University of Arkansas <i>Volunteered to present a specific topic and assist event participants in exploring the associated exercises.</i>	March 2018 and 2019

Service to the Department of Mathematics, Statistics, and Computer Science, Henderson State University

Henderson State University Assessment Team

2016-17

I was the undergraduate student representative to the university's assessment team. I advocated for undergraduate students during decision making and communicated my perspective on specific issues.

Service to the Community

Cookies for Proof

Spring 2024

Volunteered to assist UARK faculty in presenting the prime number theorem to local high school students at the Fayetteville Public Library and provide exposure to the complex analysis tools used in proving the theorem.

MOEMS Study Group

Fall 2021-23 and Spring 2022-24

Volunteered to assist group of local elementary and middle school students in preparing for national math competitions.

ACTM High School Mathematics Competition hosted by UARK

March 2019 and 2023

Volunteered to assist in grading exams and various other tasks associated with facilitating the competition.

FPL Math/Coding Club

Spring 2023

Assisted a joint team of faculty from the Departments of Mathematical Science and Computer Science at the University of Arkansas in offering an extra curricular club at the Fayetteville Public Library for local high school students interested in mathematics and computer programming.

AMC 10/12 Study Group

Fall 2021-22

Volunteered to assist group of local high school students in preparing for national math competitions.

Membership

American Mathematical Society

2017 - Present