TRIEU L. LE

Department of Mathematics and Statistics
The University of Toledo
http://www.math.utoledo.edu/~tle20/
Office phone: 1–419–530–2790
Email: trieu.le2@utoledo.edu

Education

State University of New York at Buffalo, Buffalo, New York

Ph.D. in Mathematics, 2007
Dissertation Title: "Toeplitz Operators on the Hardy and Bergman Spaces"
Dissertation Advisor: Professor Jingbo Xia

University of Science, Ho Chi Minh city, Vietnam

B.S. with Distinction in Mathematics, 2001
Honors Thesis: "On the Moment Problem for Elliptic Equations in Dimension Two"
Thesis Advisor: Professor Trong D. Dang

Professional Experience

- *Associate Professor*, UNIVERSITY OF TOLEDO, Toledo, Ohio — 08/2019 – present
- *Assistant Professor*, UNIVERSITY OF TOLEDO, Toledo, Ohio — 08/2015 – 08/2019
- *Lecturer*, UNIVERSITY OF TOLEDO, Toledo, Ohio — 08/2012 – 08/2015
- *Visiting Assistant Professor*, UNIVERSITY OF TOLEDO, Toledo, Ohio — 08/2009 – 07/2012
- *Postdoctoral Fellow*, UNIVERSITY OF WATERLOO, Ontario, Canada — 07/2008 – 06/2009
- *Postdoctoral Fellow*, UNIVERSITY OF TORONTO, Ontario, Canada — 07/2007 – 06/2008
- *Postdoctoral Fellow*, THE FIELDS INSTITUTE, Toronto, Ontario, Canada — 07/2007 – 12/2007

Honors and Awards

- Travel Support for Mathematicians, Simons Foundation, 09/2023 – 08/2028
- Outstanding Teacher Awards, University of Toledo, 2021
- Nominated for NSM Award for Excellence in Research, University of Toledo, 2018
- Summer Research Awards and Fellowships, University of Toledo, 2016
- Nominated for Outstanding Teacher Awards, University of Toledo, 2013
- Nominated for Graduate Student Excellence in Teaching Awards, University at Buffalo, 2006
- College of Arts and Sciences Fellowship, University at Buffalo, 2002 – 2006
- Dissertation Fellowship, University at Buffalo, 2005

Research Interests

- Operator theory on function spaces: Toeplitz, Hankel, composition and weighted composition operators on reproducing kernel Hilbert spaces of analytic functions
- Reproducing kernels and their applications. Frame theory and its applications.

Graduate Students

1. Damith Thilakarthna, Ph.D. in December 2018. Dissertation: *"Finite rank perturbations of Toeplitz products on the Bergman space of the unit disc"*.
2. Uthpala Nawalage, Ph.D. in June 2020. Dissertation: *"Complex symmetric weighted composition operators and Toeplitz operators"*.
3. Hamza Elsennary, current student.

Undergraduate Students

1. In Summer 2018, Brian Grove was funded $3,000 from the First Year Undergraduate Research program at the University of Toledo. Brian's project was *"Algebraic and Combinatorial Aspects of Recurrence Sequences"*, completed under my direction.
2. In Summer 2014, Samuel Park was funded $3,000 from the First Year Undergraduate Research program at the University of Toledo. Samuel investigated *"Frame Theory and Applications"* under my direction.
3. In Summer 2014, Belal Abdullah worked on a project *"On the structure of m-isometric weighted shift operators"* under my supervision. Our joint paper was published in Operators and Matrices.

Preprints and Publications

1. *Closed range posinormal operators and their products*, with Paul Bourdon, Carlos Kubrusly and Derek Thompson, Linear Algebra Appl. 671 (2023), 38–58
2. *Spectra of some weighted composition operators on the ball*, with Scott Kaschner, Chloe Makdad, Benjamin Rempfer, Derek Thompson and DeJuan Winters, Acta Sci. Math. (Szeged) (2023)
3. *Square roots of weighted shifts of multiplicity two*, with Chanaka Kottegoda and Tomas Miguel Rodriguez, Canadian Mathematical Bulletin (2023)
4. *A generalization of the Brown–Halmos theorems for the unit ball*, with Akaki Tikaradze, Adv. Math. 404 (2022), Paper No. 108411
5. *Analogues of finite Blaschke products as inner functions*, with Christopher Felder, Bull. Lond. Math. Soc. (2022)
6. *Finite rank perturbations of Toeplitz products on the Bergman space* with Damith Thilakarathna, J. Funct. Anal. 280 (2021), no. 7, Paper No. 108850
7. *Hyponormal Toeplitz operators on weighted Bergman spaces*, with Brian Simanek, Integral Transforms Spec. Funct. 32 (2021), no. 5-8, 560–567
8. *Inner functions in weighted Hardy spaces*, Anal. Math. Phys. 10 (2020), no. 2, Paper No. 25
9. *Decomposing algebraic m-isometric tuples*, J. Funct. Anal. 278 (2020), no. 8
10. *Self-commutator norm of hyponormal Toeplitz operators*, Oper. Matrices 13 (2019), no. 1, 85–91
11. *Coposinormality of the Cesàro matrices*, with H. C. Rhaly Jr., Arch. Math. (Basel) 110 (2018), no. 2, 167–173
12. *Commutants of Toeplitz operators with harmonic symbols*, with Akaki Tikaradze, New York Journal of Mathematics 23 (2017), 1723–1731
13. *Composition operators on Hilbert spaces of entire functions of several variables*, with Minh Luan Doan and Le Hai Khoi, Integr. Equ. Oper. Theory 88 (2017), no. 3, 301–330
14. *Commutants of separately radial Toeplitz operators in several variables*, J. Math. Anal. Appl. 453 (2017), no. 1, 48–63

15. *Composition operators between Segal–Bargmann spaces*, Journal of Operator Theory 78 (2017), no. 1, 135–158

16. *Composition operators between $\mathcal{N}_p$-spaces in the ball*, with Bingyang Hu and Le Hai Khoi, North-West. Eur. J. Math. 2 (2016), 103–120

17. *Adjoints of linear fractional composition operators on weighted Hardy spaces*, with Željko Čučković, Acta Sci. Math. (Szeged) 82:3-4 (2016), 651–662

18. *On the structure of m-isometric weighted shift operators*, with Belal Abdullah, Operators and Matrices 10 (2016), no. 2, 319–334

19. *Commutants of Toeplitz operators with separately radial polynomial symbols*, with Amila Appuhamy, Complex Anal. Oper. Theory 10 (2016), no. 1, 1–12.

20. *Algebraic properties of operator roots of polynomials*, J. Math. Anal. Appl. 421 (2015), no. 2, 1238–1246

21. *Normal and isometric weighted composition operators on the Fock space*, Bull. London Math. Soc. 46 (2014), no. 4, 847–856

22. *Hilbert–Schmidt Hankel operators over complete Reinhardt domains*, Integr. Equ. Oper. Theory 78 (2014), no. 4, 515–522

23. *Invertible composition operators: the product of a composition operator with the adjoint of a composition operator*, with John Clifford and Alan Wiggins, Complex Anal. Oper. Theory 8 (2014), no. 8, 1699–1706

24. *Toeplitzness of composition operators in several variables*, with Željko Čučković, Complex Var. Elliptic Equ. 59 (2014), no. 10, 1351–1362

25. *Toeplitz operators on radially weighted harmonic Bergman spaces*, J. Math. Anal. Appl. 396 (2012), 164–172

26. *Self-adjoint, unitary, and normal weighted composition operators in several variables*, J. Math. Anal. Appl. 395 (2012), 596–607

27. *Toeplitz operators on Bergman spaces of polyanalytic functions*, with Željko Čučković, Bull. London Math. Soc. 44 (2012), no. 5, 961–973

28. *Algebraic properties and the finite rank problem for Toeplitz operators on the Segal-Bargmann space*, with Wolfram Bauer, J. Funct. Anal. 261 (2011) 2617–2640

29. *Compact Toeplitz operators on Segal-Bargmann type spaces*, with Bo Li, New York J. Math. 17a (2011), 213–224

30. *Compact Hankel operators on generalized Bergman spaces of the polydisc*, Integr. Equ. Oper. Theory 67 (2010), no. 3, 425–438

31. *Commutant lifting for commuting row contractions*, with Ken Davidson, Bull. London Math. Soc. 42 (2010), no. 3, 506–516

32. *On Toeplitz operators on Bergman spaces of the unit polydisk*, Proc. Am. Math. Soc. 138 (2010), no. 1, 275–285

33. *A refined Luecking's theorem and finite rank products of Toeplitz operators*, Complex Anal. Oper. Theory 4 (2010), no. 2, 391–399

34. *Commutator ideals of subalgebras of Toeplitz algebras on weighted Bergman spaces*, J. Oper. Theory 64 (2010), no. 1, 89–101

35. *Finite-rank products of Toeplitz operators in several complex variables*, Integr. Equ. Oper. Theory 63 (2009), no. 4, 547–555

36. *Compact Toeplitz operators with continuous symbols*, Glasg. Math. J. 51 (2009), no. 2, 257–261

37. *The commutants of certain Toeplitz operators on weighted Bergman spaces*, J. Math. Anal. Appl. 348 (2008) 1–11

38. *On a class of ideals of the Toeplitz algebra on the Bergman space*, Proc. Am. Math. Soc. 136

(2008), no. 10, 3571–3577

39. *On the commutator ideal of the Toeplitz algebra on the Bergman space of the unit ball in $\mathbb{C}^n$*, J. Oper. Theory 60 (2008), no. 1, 149–163

40. *On the essential commutant of Toeplitz operators in several complex variables*, Integr. Equ. Oper. Theory 59 (2007), no. 4, 555–578

Conference/Seminar Presentations

1. *On range of Berezin transform in several variables and applications*, International Workshop in Operator Theory and Its Applications, University of Helsinki, July 31–August 4, 2023

2. *Toeplitz operators with pluriharmonic symbols on the ball*, Analysis and Data Science Seminar, University at Albany, October 26, 2021 via Zoom

3. *m-Isometries and their properties*, Trojan Mathematics Seminar, Troy University, October 14, 2021 via Teams

4. *When does $T_f T_g - T_h$ have finite rank?*, International Workshop in Operator Theory and Its Applications, Chapman University, August 9-11, 2021 via Zoom

5. *Toeplitz operators with pluriharmonic symbols on the ball*, Complex Analysis and Operator Theory Seminar, University of Toledo, March 2021 via Zoom

6. *Algebraic properties of m-isometries*, Analysis Seminar, Washington University in Saint Louis, February 2021 via Zoom

7. *Algebraic properties of m-isometries*, Analysis and Geometry Seminar, Central Michigan University, February 2019

8. *Inner functions in weighted Hardy spaces*, International Workshop on Operator Theory and Applications, Shanghai, China, July 2018

9. *A construction of inner functions on weighted Hardy spaces*, Analysis Seminar, Hebei Normal University, China, July 2018

10. *Characterizations of inner functions on the unit disk*, Summer Meetings, University of Science, Ho Chi Minh city, Vietnam, July 2018

11. *Composition operators on Hilbert spaces of entire functions*, AMS Spring Southeastern Sectional Meeting, Vanderbilt University, April 2018

12. *Commutants of separately radial Toeplitz operators on the Bergman space*, Mathematical Congress of the Americas, Montreal, Canada, July 2017

13. *Commutants of separately radial Toeplitz operators*, Ohio Conference, the Ohio State University, April 2017

14. *Algebraic properties of m-isometric commuting tuples*, 33rd South Eastern Analysis Meeting, University of Tennessee, March 2017

15. *Commutants of Toeplitz operators with separately radial polynomial symbols on the Fock space*, International Workshop on Operator Theory and Applications, Washington University in St. Louis, July 2016

16. *Hilbert–Schmidt Hankel operators with conjugate holomorphic symbols*, 32nd South Eastern Analysis Meeting, University of South Florida, March 2016

17. *Adjoints of linear fractional composition operators on weighted Hardy spaces*, AMS Sectional Meeting, Washington, DC, March 2015

18. *Isometric products of composition operators on the Hardy space*, 30th South Eastern Analysis Meeting, Clemson, March 2014

19. *Weighted composition operators on the Drury–Arveson space*, Joint Mathematics Meetings, Baltimore, January 2014

20. *Toeplitzness of composition operators in several variables*, Joint Mathematics Meetings, San Diego, January 2013

21. *Finite rank Toeplitz operators on the Segal-Bargmann space*, AMS Sectional Meeting, University of Akron, October 2012

22. *Boundedness and compactness of composition operators on Segal-Bargmann spaces*, Joint Mathematics Meetings, Boston, January 2012

23. *Some algebraic properties of Toeplitz operators on the Segal-Bargmann space*, 27th South Eastern Analysis Meeting, University of Florida, March 2011

24. *Toeplitz operators on harmonic Bergman spaces*, Great Plains Operator Theory Symposium, University of Denver, June 2010

25. *On commutator ideals of certain subalgebras of the Toeplitz algebra*, 25th South Eastern Analysis Meeting, University of South Florida, March 2009

26. *Diagonal Toeplitz operators on weighted Bergman spaces*, 24th South Eastern Analysis Meeting, Vanderbilt University, March 2008

27. *On the commutator ideal of the Toeplitz algebra on the Bergman space of the unit ball in* $\mathbb{C}^n$, Joint Mathematics Meetings, New Orleans, January 2007

28. *On the commutator ideal of the Toeplitz algebra*, 22nd South Eastern Analysis Meeting, University of Florida, March 2006

Teaching Experience

University of Toledo, Toledo, Ohio

- Mathematical modeling and problem solving (Fall 2014, Spring 2015)
- College Algebra (Fall 2011, Fall 2012, Fall 2013)
- Calculus for the Life Sciences with Applications I and II (Fall 2010)
- Calculus for Business with Applications II (Spring 2010, Fall 2009)
- Online Trigonometry Review (Fall 2013, Fall 2014). This is an online class with one live online meeting a week. The instructor presents the material and interacts with students through chatting.
- Technical Calculus I (Fall 2013)
- Calculus I for Mathematicians, Scientists and Educators (Spring 2012, Fall 2013)
- Calculus II for Mathematicians, Scientists and Educators (Spring 2014)
- Single Variable Calculus I (Fall 2009, Fall 2012, Spring 2013, Spring 2015, Fall 2021, Fall 2022, Spring 2023)
- Single Variable Calculus II (Spring 2011, Fall 2011, Spring 2012, Spring 2013, Spring 2014, Fall 2014).
- Elementary Multivariable Calculus (Fall 2015)
- Elementary Differential Equations (Spring 2011, Spring 2012, Spring 2014, Fall 2016, Spring 2017, Fall 2017, Spring 2018, Fall 2018, Spring 2019, Summer 2019, Summer 2020, Fall 2020, Summer 2022)
- Introduction to Mathematical Analysis (Fall 2022)
- Introduction to Real Analysis I and II (Fall 2017, Spring 2018, Fall 2020, Spring 2021, Fall 2021, Spring 2022)
- Introduction to Topology I and II (Fall 2014, Spring 2015)
- Complex Variables (Spring 2020, Spring 2023)
- Reading course (graduate) (Spring 2012, Spring 2016)
- Topics in Mathematical Science (graduate) (Summer 2011)

- Topics in Mathematical Science: Introduction to Operator Theory (Spring 2020)
- Topics in Mathematical Science: Numerical Ranges (Spring 2022)
- Real Analysis I (Fall 2015, Fall 2016) and II (Spring 2016, Spring 2017).
- Functional Analysis I (Fall 2018) and II (Spring 2019)

University of Waterloo, Ontario, Canada

- Calculus I for Honors Math (Winter 2009). I was the coordinator of two sections of this course. Each section had around 100 students. I was responsible for making up homework assignments (at the University of Waterloo, we do not assign homework problems directly from the textbook) and exams. We made use of Maple TA in recitations.

University of Toronto, Ontario, Canada

- College Calculus I and II (Fall 2007, Spring 2008). This class had about 110 students. I was responsible for lecturing, participating in making up exams and grading the exams with other instructors.

University at Buffalo, Buffalo, New York

- Mathematical Analysis for Management (Fall 2006, Spring 2007)
- College Calculus III (Summer 2005)

Meetings and Conferences

- International Workshop in Operator Theory and Its Applications, University of Helsinki, July 31–August 4, 2023
- Analysis and Data Science Seminar, University at Albany, October 26, 2021, Zoom
- Trojan Mathematics Seminar, Troy University, October 14, 2021, Teams
- International Workshop in Operator Theory and Its Applications, Chapman University, August 9–11, 2021, Zoom
- Analysis Seminar, Washington University in Saint Louis, February 2021, Zoom
- International Workshop on Operator Theory and Applications, East China Normal University, Shanghai, July 2018
- Hebei Normal University, Shijiazhuang, China, July 2018
- Summer Meeting, University of Science, Ho Chi Minh city, Vietnam, July 2018
- AMS Spring Southeastern Sectional Meeting, Vanderbilt University, April 2018
- Mathematical Congress of the Americas, Montreal, Canada, July 2017
- Ohio Conference, the Ohio State University, April 2017
- 33rd South Eastern Analysis Meeting, University of Tennessee, Tennessee, March 2017
- International Workshop on Operator Theory and Applications, Washington University in St. Louis, July 2016
- 32nd South Eastern Analysis Meeting, University of South Florida, Florida, March 2016
- AMS Sectional Meeting, Washington, DC, March 2015
- 30th South Eastern Analysis Meeting, Clemson University, South Carolina, March 2014
- Joint Mathematics Meeting AMS & MAA, Baltimore, Maryland, January 2014
- Joint Mathematics Meeting AMS & MAA, San Diego, California, January 2013
- AMS Sectional Meeting, University of Akron, October 2012
- Joint Mathematics Meeting AMS & MAA, Boston, Massachusetts, January 2012

- 27th South Eastern Analysis Meeting, University of Florida, March 2011
- Great Plains Operator Theory Symposium, University of Denver, June 2010
- 25th South Eastern Analysis Meeting, University of South Florida, March 2009
- 36th Canadian Operator Symposium (COSy), University of Toronto, Canada, May 2008
- 24th South Eastern Analysis Meeting, Vanderbilt University, March 2008
- Workshop on Recent Advances in Operator Theory and Function Theory, The Fields Institute, Toronto, Canada, January 2008
- Thematic Program on Operator Algebras, The Fields Institute, Toronto, Canada, Fall 2007
- 35th Canadian Operator Symposium (COSy), University of Guelph, Canada, June 2007
- Joint Mathematics Meeting AMS & MAA, New Orleans, Louisiana, January 2007
- Great Plains Operator Theory Symposium, University at Iowa, May 2006
- 22nd South Eastern Analysis Meeting, University of Florida, March 2006
- Joint Mathematics Meeting AMS & MAA, San Antonio, Texas, January 2006
- Third East Coast Operator Algebras Symposium, University of Pennsylvania, October 2005
- Summer School in Operator Algebras, University of Ottawa, Canada, June 2005

Services

- Member of the Department Personnel Committee, Fall 2020–present
- Organizer of the weekly Complex Analysis and Operator Theory seminar, Fall 2015–present.
- Member of the Research and Scholarly Affairs, Fall 2015–Spring 2016, Fall 2018–Spring 2020, Fall 2022–Spring 2023.
- Undergraduate Majors Curriculum Committee, Fall 2015–Spring 2019. I served as chair during Fall 2015–Spring 2019.
- Member of the Graduate Student Affairs Committee, Fall 2016–Spring 2018
- Member of the Undergraduate Majors Curriculum Committee, Fall 2014–Spring 2015
- Member of the Teaching Evaluation Committee, Fall 2013–Spring 2014
- Reviewer for Zentralblatt MATH and Mathematical Reviews
- Referee for numerous journals: Abstract and Applied Analysis, Acta Szeged, Advances in Operator Theory, Annals of Functional Analysis, Bulletin of the London Mathematical Society, Collectanea Mathematica, Complex Analysis and Operator Theory, Complex Variables and Elliptic Equations, Glasgow Mathematical Journal, Houston Journal of Mathematics, Illinois Journal of Mathematics, Integral Equations and Operator Theory, International Journal of Mathematics, Journal of Functional Analysis, Journal of Mathematical Analysis and Applications, Journal of Mathematical Research with Applications, Journal of the Australian Mathematical Society, Journal of Operator Theory, Journal of Spectral Theory, Mathematische Nachrichten, Operators and Matrices, Rocky Mountain Journal of Mathematics, Revista de la Real Academia de Ciencias Exactas, Taiwanese Journal of Mathematics