

1. **Name:** Loren Spice
2. **Contact information:** 2840 W Bowie St, Fort Worth, TX 76129; 817-257-6340 (office); l.spice@tcu.edu
3. **Educational background**
  - A. University of Chicago, Chicago, IL (1998–2004)
    - Ph. D. (2004), Mathematics
    - M. S. (2000), Mathematics
  - B. Towson University, Towson, MD (1996–1998)
    - B. S., *summa cum laude* (1998), Mathematics
  - C. Harford Community College, Bel Air, MD (1994–1996)
    - A. A., *with high honours* (1996), General Studies
6. **Present rank:** Associate professor
7. **Year of appointment to the University, and rank:** 2009, Assistant professor
9. **Previous teaching and/or research appointments**
  - A. **Full time**
    - University of Michigan, Ann Arbor, MI (2004–2008), Hildebrandt assistant professor, Mathematics
    - Purdue University, West Lafayette, IN (Winter 2005), Research assistant professor, Mathematics
    - University of Chicago, Chicago, IL
      - Instructor (2000–2004), Mathematics
      - College fellow (1999–2000), Mathematics
11. **Courses taught**
  - A. Texas Christian University
    - Applied Calculus (MATH 10283, Fall 2021, Fall 2019, Spring 2019, Fall 2018, Fall 2017, Fall 2015, Fall 2013, Fall 2012, Spring 2012, Fall 2011)
    - Calculus I (MATH 10524, Spring 2023, Spring 2022, Spring 2012, Spring 2010, Fall 2009 (2 sections))
    - Discrete Mathematics I (MATH 20123, Fall 2022, Fall 2020, Fall 2019, Spring 2019, Spring 2018, Spring 2013)
    - Calculus II (MATH 20524, Fall 2022, Fall 2021, Spring 2021)
    - Discrete Mathematics II (MATH 30123, Spring 2014)
    - Linear Algebra (MATH 30224, Spring 2023, Spring 2021, Spring 2020, Spring 2017)
    - Calculus III (MATH 30524, Spring 2020, Spring 2017, Spring 2016, Spring 2015, Spring 2014, Spring 2013)
    - Differential Equations (MATH 30613, Spring 2022, Fall 2020, Spring 2016, Fall 2015, Fall 2014, Fall 2013, Fall 2012, Spring 2011, Fall 2010)
    - Teaching of Mathematics (MATH 40003/60003, Spring 2010)
    - Higher Geometry (MATH 40403/60403, Fall 2011)
    - Real Analysis I (MATH 50503, Fall 2017)

- Real Analysis II (MATH 60503, Spring 2018)
  - Measure Theory (MATH 60523, Fall 2014, Spring 2011)
  - Modern Fourier Analysis (MATH 60553, Spring 2015)
  - Independent reading: Representation theory, Luis Aguirre (Fall 2014)
  - Independent reading: Measure theory, Brian Preskitt (Spring 2013)
  - Independent study: Proof and computer science, Sneha Popley (Spring 2010)
- B. University of Michigan
- Representation theory of  $p$ -adic groups (Math 715, Fall 2008)
  - Topics in Geometry for Teachers (Math 431, Fall 2008)
  - Algebra II (Math 594, Winter 2008)
  - Concepts Basic to Secondary Mathematics (Math 486, Winter 2008)
  - Concepts Basic to Secondary Mathematics (Math 486, Winter 2007)
  - Math for Elementary-School Teachers (Math 385, Fall 2006)
  - Concepts Basic to Secondary Mathematics (Math 486, Winter 2006)
  - Theory of Algorithms (Math 416, Fall 2005)
  - Calculus III (Math 215, Fall 2004)
- C. Purdue University
- Ordinary Differential Equations (MA266, 2 sections, Winter 2005)
- D. University of Chicago
- Mathematical Methods for Biological or Social Sciences II (Math 196, Winter 2004)
  - Mathematical Methods for Biological or Social Sciences I (Math 195, Fall 2003)
  - Calculus II (Math 152, Winter 2002)
  - Calculus I (Math 151, Fall 2001)
  - Calculus II (Math 152, Winter 2001)
  - Calculus I (Math 151, Fall 2000)
- E. Other
- Probability (2-week teacher-training course in SESAME at University of Chicago (Summer 2018))
  - Geometry (2-week teacher-training course in SESAME at University of Chicago) (Summer 2017)
  - Number theory (2-week teacher-training course in SESAME at University of Chicago) (Summers 2014–2016)

## 12. External support sought

### A. Received

- Midwest Representation-Theory Conference 2022 (joint with S. DeBacker, J. Fintzen, and M. Krishnamurthy, \$25000)

- Simons Foundation Collaboration Grant “Character computations and applications to  $p$ -adic harmonic analysis” (2019–2024, \$42000)
- American Institute of Mathematics SQuaRE “Character computations and the local Langlands correspondence” (2018–2020, travel and lodging for three week-long summer workshops)
- Simons Foundation Collaboration Grant “Characters and  $p$ -adic representation theory” (2012–2018, \$35000)
- National Science Foundation Focussed-Research Grant “Characters, liftings, and types” (joint with J. Adler, S. DeBacker, J. Hakim, J.-L. Kim, J. Lansky, M. Reeder, N. Thiem, R. Vinroot, J.-K. Yu) (2009–2012, \$104308)
- National Science Foundation Mathematical Sciences Post-doctoral Research Fellowship (2005–2009)

#### B. Not received

- National Science Foundation Grant “Representations and structure theory of reductive  $p$ -adic groups” (2022, \$222594)
- Midwest Representation-Theory Conference 2020 (joint with S. DeBacker, J. Fintzen, and M. Krishnamurthy, \$49869; withdrawn due to COVID)
- Midwest Representation-Theory Conference 2018 (joint with S. DeBacker and V. Ginzburg) (2019, \$53007)
- Simons Foundation Collaboration Grant “Applications of characters in  $p$ -adic harmonic analysis” (2018, \$42000)

### 13. Internal support sought

#### A. Received

- TCU Andrews Institute Research Grant “Bridging the Gap” (joint with S. Quebec Fuentes) (2012–2013, \$2564)
- TCU Andrews Institute Research Grant “Bridging the Gap” (joint with S. Quebec Fuentes) (2011–2012, \$5700)
- TCU Andrews Institute Research Grant “Bridging the Gap” (joint with S. Quebec Fuentes) (2010–2011, \$5995)

### 14. Graduate theses and dissertations directed

- Member on doctoral committee of Jeremy Smith (graduated 2018)
- Cognate member on doctoral committee of Helen Siedel, University of Michigan School of Education (2008–2009)

### 15. Presentations of scholarly and creative activities

#### A. Refereed publications

- *A twisted Yu construction, Harish-Chandra characters, and endoscopy*, to appear, *Duke Math. J.* (45 pp.; available at [arXiv:2106.09120](https://arxiv.org/abs/2106.09120)).
- *The Bernstein projector determined by a weak associate class of good cosets* (joint with Y. Kim and S. Varma), *Int. Math. Res. Not.* **2022**, no. 21 (2022), pp. 17231–17259.

- *Explicit asymptotic expansions for tame supercuspidal characters*, *Compositio Math.* **154**, no. 11 (2018), pp. 2305–2378.
- *Stability of positive-depth, supercuspidal character computations* (joint with S. DeBacker), *J. reine angew. Math.* **742** (2018), pp. 47–78.
- *Fostering collaboration and the co-construction of knowledge: A multi-dimensional perspective* (joint with S. Quebec Fuentes), *NCTM Annual perspectives on mathematical education 2017*.
- *Challenges encountered in trying to build a university–high school collaboration: A case study* (joint with S. Quebec Fuentes), *The Professional Educator* **39**, no. 1 (2015), 20 pp.
- *Building a university–high school collaboration* (joint with S. Quebec Fuentes), *Academic Exchange Quarterly*, Winter 2012, 6 pp.
- *Fourier transforms of semisimple orbital integrals on the Lie algebra of  $SL_2$* , *Pac. J. Math.* **254**, no. 2 (2011), 407–448
- *Supercuspidal characters of  $SL_2$  over a  $p$ -adic field* (joint with J. Adler, S. DeBacker, and P. Sally, Jr.), in “Harmonic analysis on reductive,  $p$ -adic groups” (*Contemp. Math.* **543**), 19–70
- *On the computability of some positive-depth characters near the identity* (joint with R. Cluckers, C. Cunningham, and J. Gordon), *Represent. Theory* **15** (2011), 531–567
- *Supercuspidal characters of reductive,  $p$ -adic groups* (joint with J. Adler), *Amer. J. Math.* **131** (2009), no. 4, 1137–1210
- *Good product expansions for tame elements of  $p$ -adic groups* (joint with J. Adler), *Internat. Math. Research P.* **2008**, 95 pp.
- *Topological Jordan decompositions*, *J. Algebra* **319** (2008), no. 8, 3141–3163
- *Supercuspidal characters of  $SL_\ell$  over a  $p$ -adic field,  $\ell$  a prime*, *Amer. J. Math.* **127** (2005), no. 1, 51–100

#### B. Non-refereed publications

- *Character theory of reductive,  $p$ -adic groups* (joint with P. Sally, Jr.), in “Ottawa lectures on admissible representations of reductive,  $p$ -adic groups” (*Fields-Institute Monographs* **26**) (2009), 103–111

#### D. Material under active review

- *Explicit asymptotic expansions in  $p$ -adic harmonic analysis II*, submitted (74 pp.; available at [arXiv:2108.12935](https://arxiv.org/abs/2108.12935))

#### D'. Material in preparation

- *Complete reducibility and quasi-reductive groups* (currently 124 pp.; proposals submitted to two publishers)
- *On finite-group actions on reductive groups and buildings II* (currently 81 pp.)

#### E. Papers presented

- *Explicit character formulæ for tame supercuspidals via asymptotic expansions*, Representations and Characters—a satellite conference of the International Congress of Mathematicians 2022 (July 2022)
- *Asymptotic expansions of characters and orbital integrals*, spring meeting of the American Mathematical Society (May 2022)
- *Explicit character formulæ for tame supercuspidals via asymptotic expansions*, conference on basic functions, orbital integrals, and beyond endoscopy at BIRS (November 2021)
- *New developments in the theory of tame, supercuspidal representations*, summer meeting of the Canadian Mathematical Society (June 2019)
- *New developments in the theory of tame, supercuspidal representations*, TORA IX at University of North Texas (April 2019)
- *Asymptotic expansions of characters*, special session on representations of reductive groups over local fields and related topics at University of Michigan (October 2018)
- *Asymptotic expansions of characters*, 3-lecture series at Chinese University Hong Kong (May 2017)
- *Asymptotic expansions of characters*, workshop on characters and orbital integrals at University of Michigan (August 2016)
- *Asymptotic expansions of characters*, Texas–Oklahoma Representation Theory and Automorphic Forms conference at Oklahoma State University (April 2016)
- *Asymptotic expansions of characters*, workshop on characters of supercuspidal representations of  $p$ -adic groups at Harvard University (February 2016)
- *Asymptotic expansions of characters*, winter meeting of the Canadian Mathematical Society (special session on representation theory) (December 2015)
- *Asymptotic expansions of characters*, workshop on geometry and representation theory at the University of Pittsburgh (February 2015)
- *Asymptotic expansions for characters and orbital integrals*, workshop on motivic integration, orbital integrals, and  $\zeta$  functions at Banff International Research Station (December 2014)
- *Computing supercuspidal characters, inductively*, Midwest Representation Theory Conference at University of Chicago (September 2014)
- *Stability and endoscopic transfer for toral, supercuspidal representations*, algebra seminar at University of Texas (March 2014)

- *Stability and sign changes in  $p$ -adic harmonic analysis*, sectional meeting of the Canadian Mathematical Society at University of Ottawa (special session on representation theory of real and  $p$ -adic groups) (December 2013)
- *The effect of ramification on signs in supercuspidal character formulæ*, Texas–Oklahoma Representation Theory and Automorphic Forms conference at Oklahoma State University (September 2013)
- *Stability and sign changes in  $p$ -adic harmonic analysis*, Pacific Rim Mathematical Association Congress at Shanghai Jiao Tong University (session on number theory and representation theory) (June 2013)
- *Stability and sign changes in  $p$ -adic harmonic analysis*, representation-theory seminar at University of Utah (March 2013)
- *Sign changes in  $p$ -adic harmonic analysis*, Texas–Oklahoma Representation Theory and Automorphic Forms conference at University of Oklahoma (September 2012)
- *Supercuspidal characters of  $p$ -adic groups* (2-day workshop), workshop & conference on characters, liftings, and types at American University (June 2012)
- *Bridging the gap: Building university–high school collaboration*, Conference for the Advancement of Mathematics Teaching (July 2011)
- *Characters without compactness*, conference on characters, liftings, and types at University of Colorado (July 2011)
- *Harmonic analysis on  $p$ -adic  $SL_2$* , sectional meeting of CMS at University of British Columbia (session on  $p$ -adic groups, automorphic forms, and geometry) (December 2010)
- *Characters tell all: Harmonic analysis on reductive,  $p$ -adic groups*, Millican Colloquium at University of North Texas (October 2010)
- *Harmonic analysis on  $p$ -adic  $SL_2$* , Automorphic Forms and Representation Theory conference at Oklahoma University (October 2010)
- *Supercuspidal characters of  $SL_2$* , conference on characters, liftings, and types at University of Michigan (June 2010)
- *Characters tell all: Harmonic analysis on reductive,  $p$ -adic groups*, Kempner Colloquium at University of Colorado (April 2010)
- *Supercuspidal characters and applications*, Lie-groups seminar at MIT (March 2009)
- *Supercuspidal characters and applications*, automorphic-forms and representation-theory seminar at Purdue University (March 2009)

- *Harmonic analysis on reductive,  $p$ -adic groups*, research talk at DePaul University (February 2009)
- *Harmonic analysis on reductive,  $p$ -adic groups*, research talk at Eastern Illinois University (February 2009)
- *Harmonic analysis on reductive,  $p$ -adic groups*, Frank Stones Colloquium at Texas Christian University (January 2009)
- *Supercuspidal characters and applications*, sectional meeting of AMS at Western Michigan University (session on representations of real and  $p$ -adic Lie groups) (October 2008)
- *Supercuspidal characters and applications*, sectional meeting of AMS at University of British Columbia (session on  $p$ -adic groups and automorphic forms) (October 2008)
- *Characters of tame,  $p$ -adic groups*, sectional meeting of AMS at DePaul University (session on automorphic forms: representations of  $p$ -adic and adèlic groups) (October 2007)
- *Characters of division algebras over a  $p$ -adic field*, conference on the representation theory of  $p$ -adic groups at King's College, in honour of Colin Bushnell (June 2007)
- *Characters of division algebras over a  $p$ -adic field*, automorphic-forms and representation-theory seminar at Purdue University (March 2007)
- *Characters of division algebras over a  $p$ -adic field*, study seminar at University of British Columbia (November 2006)
- *Characters of tame division algebras over a  $p$ -adic field*, number-theory and representation-theory seminar at University of Toronto (November 2005)
- *Supercuspidal characters of  $p$ -adic  $SL_\ell$ ,  $\ell$  a prime*, CMS/CSHPM meeting at University of Waterloo (session on representation theory) (June 2005)
- *Supercuspidal characters of  $SL_\ell$  with  $\ell$  a prime - I and II*, automorphic-forms and representation-theory seminar at Purdue University (January and February 2005)
- *Supercuspidal characters of  $SL_\ell$  over a  $p$ -adic field,  $\ell$  a prime*, sectional meeting of AMS at Northwestern University (session on representation theory of reductive groups) (October 2004)
- *Supercuspidal characters of  $SL_\ell$  over a  $p$ -adic field,  $\ell$  a prime*, Lie-theory and group-theory seminar at University of Michigan (September 2003)
- *Supercuspidal characters of  $SL_\ell$  over a  $p$ -adic field,  $\ell$  a prime*, student seminar at University of Chicago (May 2003)

#### 16. Conferences organized and editorships

- Organizer of Midwest Representation-Theory Conference (joint with S. DeBacker, J. Fintzen, and M. Krishnamurthy) online (March 2022)
- Organizer of Midwest Representation-Theory Conference (joint with S. DeBacker, J. Fintzen, and M. Krishnamurthy) online (October 2020)

- Organizer of Midwest Representation-Theory Conference (joint with S. Takeda) at University of Missouri (November 2015)
- Organizer of workshop & conference on characters, liftings, and types (joint with J. Adler, S. DeBacker, J. Hakim, J. Lansky, and R. Vinroot) at American University (June 2012)
- Editor of *Harmonic analysis on reductive, p-adic groups* (joint with R. Doran and P. Sally, Jr.), Contemp. Math. **543**
- Organizer of special session on harmonic analysis on reductive, p-adic groups (joint with R. Doran and P. Sally, Jr.), special session at AMS joint meeting in Washington, D. C. (January 2010)

#### 17. Academic advising activities

- Undergraduate orientation advising (Summers 2022–present)
- Undergraduate math-major advising (2014–present; recent average 9 advisees per semester)

#### 18. Departmental service

- Member of committee on placement exams for Applied Calculus and Calculus I (Fall 2023–present)
- Updated MATH 30224 (Linear Algebra) department syllabus (Summer 2023)
- Co-chair, with Kristi Rittby, of ad hoc committee to evaluate placement credit for AP Pre-calculus (Summer 2023)
- Member of ad hoc committee to update advisory-committee bylaws (Summer 2023; currently on hold)
- Member of computational-course committee (Spring 2023)
- Applied calculus placement data administrator (2022)
- Updated MATH 10283 (Applied Calculus) department syllabus (Fall 2021)
- Member of MATH 10283 (Applied Calculus) textbook selection committee (Fall 2021)
- Department tea founder and organizer (2015–2020)
- Ph.D. advisory committee for Jeremy Smith (2015–2018)
- Ph.D. advisory committee for Jeremy Taylor (2014–2016)
- Advising mentor (Dennis Ledis; Drew Tomlin)
- Teaching mentor (Segun Ofe, Fall 2022; Fazle Rabby, Fall 2018; Douglas Wagner, Spring 2018; Isai Chavarri, Fall 2017 (interrupted due to Mr Chavarri’s health issues); Luis Aguirre, Spring 2017; Kyle Matthews, Spring 2016, Fall 2015, Spring 2015, Fall 2014)
- Department advisory committee (2015–2019)
- Member of committee on mathematics for elementary teachers course (2014–2015)
- Chair of bridge-course committee (2013–2015)
- Graduate admissions committee (Springs 2010–present)
- MATH 10524–20524–30524 (Calculus sequence) textbook selection committee (Spring 2010)



## 20. University service

- Title IX hearing panelist (2022–present)
- Faculty Senate (Educational-Evaluation committee (2022–2023))
- Faculty Senate (Faculty-Relations committee) (2020–2022)
- Academic-Appeals Committee (2019–2022)
- Faculty-Senate Liaison to Diversity, Equity, and Inclusion committee (2018–2019)
- Member of TCU Website Re-Design Committee (2017–2018)
- Member on Honours College Student Achievement and GPA Task Force (2015–2016)
- Faculty-Senate Liaison to Honours College Faculty Advisory Council (2014–2016)
- Faculty Senate (Academic-Excellence committee) (2011–2019)
- Faculty Senate (Student-Relations committee) (2010–2011)
- Student move-in assistant (Summers 2009–2013)

## 21. Community activities

- Co-organiser of Fort Worth Math Circle (with A. Couser, E. Hanson, E. Herzig, and D. Tomlin) (2018–2019)
- Expository talks
  - *It's a bird, it's a plane ... no, it's a supertask!* (November 2021)
  - *A new sum of cubes*, TCU Math Club (November 2019)
  - *Yes or no?*, Fort Worth Math Circle (September 2018)
  - *Exploring patterns* (as co-assistant to Emily Herzig), Fort Worth Math Circle (May 2018)
  - *Generating functions and counting*, TCU Math Club (April 2018)
  - *Pancake numbers* (as assistant to Sarah Koch), University of Michigan Math Teacher Circle (2016)
  - *I cannot tell a Fibonacci*, University of Michigan Math Teacher Circle (2016)
- Referee for Adv. Math., Amer. J. Math., Annals of Mathematics, Canad. Math. J., Compositio Math., Electron. Res. Announc. Math. Sci., Internat. Math. Res. Not., Internat. Math. Res. Pap., J. Amer. Math. Soc., J. Eur. Math. Soc., J. Number Theory, manuscripta math., Michigan Math. J., Represent. Theory, Transform. Groups
- Grant reviewer for National Security Agency
- Reviewer for Math. Rev.
- Reviewer for Math. Zentralblatt

## 22. Memberships in professional organisations: None.