

# Nathan Burns

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🌐 LinkedIn  
🌐 Website

## 🎓 Education

### University of Tennessee

Ph.D in Mathematics

▶ Thesis: *The Free Boundary Curve Shortening Flow and Its Ancient Solutions*

M.S in Mathematics

▶ Concurrent Masters Degree: Awarded on the Way to Completing Ph.D

2021 - 2027

KNOXVILLE, TN

### University of Edinburgh

M.Math in Mathematics

▶ First Class with Honours

2016 - 2020

EDINBURGH, UK

## 📖 Research

### Publications

▶ T. Bourni, N. Burns and S. Catron, "Classification of convex ancient solutions to free boundary curve shortening flow in convex domains",  
*The Journal of Geometric Analysis*, Vol. 35, No. 7. JULY 2025

### Preprints

▶ T. Bourni, N. Burns, and M. Langford, "Stability of the Shrinking Semi-Circle Under the Free Boundary Curve Shortening flow",  
*arXiv:2603.06949* MARCH 2026

### Miscellaneous Research

▶ A. Ho, S. Bagley, C. Beckford, N. Burns, E. Campbell, J. Kingsley and Mary E. Pilgrim, "In Between High School and College: A Qualitative Study on Educators' Self-Reported Teaching Practices",  
*Journal of Education*, DOI:10.1177/00220574261416889 2026  
- THIS RESEARCH WAS DONE AS PART OF A RESEARCH ASSISTANTSHIP DURING THE FIRST YEAR OF GRADUATE STUDY.

## 🛠️ Service

### Co-Organizer for the Geometric Analysis Seminar

2025/2026 ACADEMIC YEAR

▶ University of Tennessee

## 🔗 Academic Activity

### Academic Visitor

MARCH 2. - MARCH 8. 2025

▶ Australian National University

### Program Associate

OCT. 21. - NOV. 22. 2024

▶ SLMATH (Formerly the MSRI)

▶ New Frontiers in Curvature: Flows, General Relativity, Minimal Submanifolds and Symmetry.

## 🎤 Talks

- ▶ Johns Hopkins University - Geometric Analysis Seminar APRIL 2026
- ▶ NORTH CAROLINA STATE UNIVERSITY - GEOMETRY AND TOPOLOGY SEMINAR APRIL 2026
- ▶ AMS SPRING SOUTHEASTERN MEETING: GEOMETRIC AND NON-SMOOTH ANALYSIS MARCH 2026
- ▶ AMS FALL CENTRAL MEETING: RIEMANNIAN GEOMETRY AND SYMMETRY II OCT. 2025
- ▶ RUTGERS GAUGE THEORY, LOW-DIMENSIONAL TOPOLOGY, AND GEOMETRIC ANALYSIS MAY 2025
- ▶ AUSTRALIAN NATIONAL UNIVERSITY - GEOMETRIC ANALYSIS SEMINAR MARCH 2025
- ▶ MATRIX-MFO TANDEM WORKSHOP: NONLINEAR GEOMETRIC DIFFUSION EQUATIONS FEB. 2025
- ▶ SLMATH (FORMERLY THE MSRI) - GRADUATE STUDENT SEMINAR NOV. 2024
- ▶ PUNTA DEL ESTE (URUGUAY) - GEOMETRIC FLOWS AND RELATIVITY WORKSHOP MARCH 2024

## Conference Attendance

- ▶ AMS Spring Southeastern Meeting: Geometric and Non-Smooth Analysis MARCH 2026
- ▶ COURANT-RUTGERS GEOMETRIC ANALYSIS WORKSHOP 2026 - RUTGERS UNIVERSITY JAN. 2026
- ▶ TEXAS GEOMETRY AND TOPOLOGY CONFERENCE - UT DALLAS NOV. 2025
- ▶ AMS FALL CENTRAL MEETING: AMS SPECIAL SESSION ON RIEMANNIAN GEOMETRY AND SYMMETRY II OCT. 2025
- ▶ TOPICS IN DIFFERENTIAL GEOMETRY - BROWN UNIVERSITY JUNE 2025
- ▶ RUTGERS GAUGE THEORY, LOW-DIMENSIONAL TOPOLOGY, AND GEOMETRIC ANALYSIS MAY 2025
- ▶ MATRIX-MFO TANDEM WORKSHOP: NONLINEAR GEOMETRIC DIFFUSION EQUATIONS FEB. 2025
- ▶ THE 30TH SOUTHERN CALIFORNIA GEOMETRIC ANALYSIS SEMINAR - UC IRVINE FEB. 2025
- ▶ GEOMETRY AND ANALYSIS OF SPECIAL STRUCTURES ON MANIFOLDS - SLMATH NOV. 2024
- ▶ RECENT PROGRESS ON GEOMETRIC ANALYSIS AND RIEMANNIAN GEOMETRY - SLMATH OCT. 2024
- ▶ BRIDGING PDE AND GEOMETRIC FLOWS - CARDIFF UNIVERSITY JULY 2024
- ▶ KANSAS GEOMETRIC ANALYSIS CONFERENCE - WICHITA STATE UNIVERSITY APRIL 2024
- ▶ GEOMETRIC FLOWS AND RELATIVITY WORKSHOP - PUNTA DEL ESTE (URUGUAY) MARCH 2024
- ▶ GEOMETRIC FLOWS AND RELATIVITY SUMMER SCHOOL - UNIVERSIDAD DE LA REPÚBLICA MARCH 2024

## Teaching

*All teaching as a graduate student at the University of Tennessee.*

### ▶ Instructor of Record

- ▶ Math 152 - Calculus for the Life Sciences (2 Sections)
- ▶ Math 123 - Finite Mathematics (2 Sections)
- ▶ Math 113 - Mathematical Reasoning (3 Sections)

### ▶ Teaching Assistant

- ▶ Math 241 - Calculus III (1 Section)
- ▶ Math 231 - Differential Equations I (1 Section)
- ▶ Math 125 - Basic Calculus (1 Section)
- ▶ Math 119 - College Algebra (1 Section)
- ▶ Math 113 - Mathematical Reasoning (2 Sections)

## Fellowships/Awards

*All Awards Received as a Graduate Student at the University of Tennessee*

- ▶ Summer Departmental Research Fellowship SUMMER 2025
- ▶ SPIKE TICKLE STEM ENDOWED FELLOWSHIP SPRING 2025
- ▶ GRADUATE STUDENT FELLOWSHIP: PASSING UTK ORAL EXAM EARLY SPRING 2024
- ▶ GRADUATE STUDENT ACADEMIC ACHIEVEMENT AWARD SPRING 2024
- ▶ GRADUATE STUDENT FELLOWSHIP: PASSING PRELIMINARY EXAMS EARLY SPRING 2023
- ▶ F.M DRYZER MEMORIAL FELLOWSHIP FALL 2021
- ▶ GRADUATE SCHOOL FELLOWSHIP: PREVIOUS OUTSTANDING RECORD THROUGHOUT GRAD. SCHOOL