Bennett Clayton

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Research Interests

Numerical methods for PDEs, hyperbolic conservation laws, finite element method, compressible Euler equations, equations of state, Lagrangian hydrodynamics, multi-material compressible flow

Educational background

2016 – Present **PhD, Mathematics**, *Texas A&M University*, College Station, TX, Dec 2021.

2012 – 2014 **MS, Mathematics**, *The University of North Carolina Charlotte*, Charlotte, NC, May 2014.

2007 – 2012 **BS, Mathematics (Russian minor)**, *The University of North Carolina Charlotte*, Charlotte, NC, Dec 2012.

Experience

2016 – Present **Graduate Teaching/Research Assistant**, *Texas A&M University*, College Station, TX.

2014 – 2016 **Part Time Instructor**, *The University of North Carolina Charlotte*, Charlotte, NC.

Publications

2022 **Clayton, B.**, Guermond, J-L., Maier, M., Popov, B., Tovar, E. *Robust second-order approximation for the compressible Euler Equations with an arbitrary equation of state*. **Submitted July 2022**.

Clayton, B., Guermond, J-L., Popov, B., *Invariant Domain-Preserving Approximations for the Euler Equations with Tabulated Equation of State*. **SIAM Journal on Scientific Computing 44(1):A444-A470, 2022**.

Research projects

2019 - Present **Graduate Research Assistant**, *Texas A&M University*, Robust numerical methods for the compressible Euler equations with a tabulated equation of state.
Advisor: Bojan Popov.

Software development

2020 - Present **TAMU**, `ryujin` – A high-performance finite-element solver for the compressible Navier-Stokes and Euler equations.

TAMU, In house FORTRAN code for solving the compressible Euler equations.

Talks

2021 *Invariant Domain Preserving Methods for the Compressible Euler Equations with a Tabulated Equation of State*, 15th World Congress on Computational Mechanics & 8th Asian Pacific Congress on Computational Mechanics (WCCM-APCOM 2022), Yokohama (*virtual conference*), Japan, August 2022.

Invariant-Domain Preserving Approximation of the Compressible Euler Equations with Tabulated Equation of State, 4th Annual Meeting of the SIAM Texas-Louisiana Section (TXLA21), South Padre Island, TX, November 2021.

2020 *Invariant-Domain Preserving Approximation of the Compressible Euler Equations with Tabulated Equations of State*, Center for Large-Scale Scientific Simulations Seminar, Texas A&M University, College Station, TX, USA. April, 2021.

Teaching Experience

2022 **Instructor of Record**, *Department of Mathematics*, Texas A&M University.
- Summer 2022: Mathematics for Business and Social Sciences (MATH 140);

2016–2021 **Graduate Teaching Assistant**, *Department of Mathematics*, Texas A&M University.
- Summer 2021: Instructor for PhD qualifying exam preparatory class (numerical analysis)
- Fall 2019: Class teaching assistant for Math Modeling. Duties included: grading, preparing assignments and projects, and teaching `Python` (Math 442)
- Summer 2019: Instructor for PhD qualifying exam preparatory class (numerical analysis)
- Spring 2019: Class teaching assistant for Numerical Analysis. Duties included: teaching `Python`, recitation, and grading (Math 417)
- Fall 2018: Class teaching assistant for Engineering Calculus I. Duties included: teaching `MATLAB`, quiz preparation, grading, and recitation (Math 151, *3 sections*)
- Summer 2018: Grader for Advanced Calculus I (Math 409)
- Spring 2018: Class teaching assistant for Engineering Calculus II. Duties included: teaching `MATLAB`, grading, and recitation (Math 151, *3 sections*)
- Fall 2017: Class teaching assistant for Engineering Calculus I. Duties included: teaching `MATLAB`, quiz preparation, grading, and recitation (Math 151, *3 sections*)
- Summer 2017: Tutor for walk-in math help session
- Spring 2017: Grader for Modern Algebra I (Math 415)
- Fall 2016: Grader for History of Mathematics (Math 629)

2014–2016 **Part Time Instructor**, *Department of Mathematics*, The University of North Carolina Charlotte.
- Spring 2016: Instructor for,
  - College Algebra (Math 1100, *2 sections*)
  - Calculus I (Math 1241, *1 section*)
  - Linear Algebra (Math 2164, *1 section*)
- Fall 2015: Instructor for,
  - College Algebra (Math 1100, *2 sections*)
  - Business Calculus (Math 1120, *2 section*)
- Spring 2015: Instructor for,
  - Business Calculus (Math 1120, *2 section*)
  - Calculus II (Math 1242, *1 online section*)
- Fall 2014: Instructor for,
  - Business Calculus (Math 1120, *1 section in-person, 1 section online*)
  - Calculus for Engineering Technology (Math 1121, *2 sections*)

2015 **Graduate Student Instructor**, *Department of Mathematics*, The University of North Carolina Charlotte.
- Spring 2015: Instructor for Precalculus (Math 1103, *1 section*);

Leadership

2021 **Co-organizer**, Mini-symposia on "High-order structure preserving techniques for simulating transport phenomena and fluids", 4th Annual Meeting of the SIAM Texas-Louisiana Section (TXLA21), November 2021.

2019 - 2020 **President**, Society for Industrial and Applied Math Graduate Student Chapter, Texas A&M University.

2018 - 2019 **Liaison Officer**, Society for Industrial and Applied Math Graduate Student Chapter, Texas A&M University.

Outreach/mentorship

2022-Present **Mentor**, Mentoring an undergraduate student in a special topic for the Directed Reading Program, Texas A&M.

2022 **Judge**, Judged students presentations for the Texas Junior Science and Humanities Symposia in the math and computer science group, Texas A&M University.

2019 **Volunteer**, Volunteer work done for the Texas A&M Integral Bee, Texas A&M University.

2016 **Volunteer**, Grader for the Texas A&M High School Mathematics Constest, Texas A&M University.

Computer software

- Fortran, Python, C++ (with deal.II), LaTeX, MATLAB, Mathematica

Youtube

- Educational Mathematics Channel: clayton89

Languages

- English, Russian (intermediate), Korean (beginner)