# Jessica Stewart Kelly

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1 Avenue of the Arts, Newport News, VA 23606

## Education

**Baylor University**, PhD in Mathematics 2009 – 2014

- Thesis: *Spectral Analysis of the Exceptional Laguerre and Jacobi Expressions*
- Advisers: Constanze Liaw and Lance Littlejohn

**Elon University**, BS in Mathematics 2005 – 2009

- Minors: Dance and Multimedia Authoring and Rhetoric

## Employment

**Christopher Newport University**
Center for Effective Teaching
Associate Director 2023 – Present
Department of Mathematics
Associate Professor 2021 – Present
Assistant Professor 2015 – 2021

**Goucher College**
Department of Mathematics and Computer Science
Assistant Professor 2014-2015

**Baylor University**
Department of Mathematics
Instructor of Record 2010 – 2014
Teaching Assistant 2009 – 2010

## Publications

16. S. Dhar, L. Naples, and **J. Stewart Kelly**, *Lower bounds for weighted quasilinear eigenvalue problems with periodic and anti-periodic boundary conditions.* In preparation (2026).
15. M. Morena, **J. Stewart Kelly**, and G. Kuster, *Designing and sustaining community-engaged learning in undergraduate mathematics.* In preparation (2026).
14. S. Dhar and **J. Stewart Kelly**, *Lyapunov-type inequalities for systems of second order quasilinear differential equations.* Electron. Res. Arch. vol. 34 (2026), iss. 6, pp. 3843-3857.
13. B. Convington, C. Hamm, **J. Stewart Kelly**, V. Buehlman, A. Timmer, A. Cobos, W. Donaldson, G. Kuster, A. Rose. *From margins to mainstream: Strategies for integrating community-engaged learning into higher education*. J. High. Educ. Outreach Engagem. vol. 29 (2024), no. 3.
12. D. Frymark and **J. Stewart Kelly**, *The spectrum of self-adjoint extensions associated with exceptional Laguerre differential expressions*. Journal of Spectral Theory, vol. 13 (2023) no. 3, pp. 991-1043.
11. S. Dhar and **J. Stewart Kelly**, *Lower bounds for eigenvalues of even ordered quasilinear differential equations*. Proceedings of the American Mathematical Society, vol. 151 (2023), pp. 647-661.
10. S. Dhar, **J. Stewart Kelly**, and Q. Kong, *Lyapunov-type inequalities for third order linear and half-linear difference equations*. Journal of Difference Equations and Applications, vol. 27 (2021).

9. **J. Stewart Kelly**, *Mastering your sales pitch: selling mastery based teaching to yourself and your students*. Problems, Resources, and Issues in Undergraduate Mathematics Studies, vol. 30 (2020), iss. 8-10, pp. 979-994.
8. S. Dhar and **J. Stewart Kelly**, *A non-Green's approach to fractional Lyapunov-type inequalities with applications to multivariate domains*. Differential Equations and Applications, vol. 11 (2019), iss. 3, pp. 409-425.
7. C. Liaw, **J. Stewart Kelly**, and J. Osborn, *Moment representations of exceptional Type I $X_2$ exceptional Laguerre polynomials*. Advances in Dynamical Systems and their Applications, vol. 14 (2019), iss. 1, pp. 49-65.
6. J. Collins, A. Harsy, J. Hart, K. Haymaker, A. Hoofnagle, M. Janssen, **J. Stewart Kelly**, A. Mohr and J. OShaughnessy. *Mastery-based testing in undergraduate mathematics courses*. Problems, Resources, and Issues in Undergraduate Mathematics Studies, vol. 29 (2019), iss. 5, pp. 441-460.
5. C. Liaw, **J. Stewart Kelly**, and J. Osborn. *Moment representations of exceptional $X_1$ orthogonal polynomials*, Journal of Mathematical Analysis and Application, vol. 455 (2017), pp. 1848-1869.
4. C. Liaw, L. Littlejohn, R. Milson, and **J. Stewart**. *A new class of exceptional orthogonal polynomials: the Type III $X_m$-Laguerre polynomials and the spectral analysis of three types of exceptional Laguerre polynomials*, Journal of Approximation Theory, vol. 202 (2016), iss. 36, pp. 5-41.
3. C. Liaw, L. Littlejohn, and **J. Stewart**. *The spectral analysis for the $X_m$-exceptional Jacobi polynomials*. Electronic Journal of Differential Equations, vol. 2015 (2015), iss. 194, pp. 1-10.
2. C. Liaw, L. Littlejohn, **J. Stewart**, and Q. Wicks. *A spectral study of the second-order exceptional $X_1$-Jacobi differential expression and a related classical Jacobi expression*. Journal of Mathematical Analysis and Applications, vol. 422 (2015), iss. 1, pp. 212-239.
1. M. Atia, L. Littlejohn, and **J. Stewart**. *The spectral theory of the $X_1$-Laguerre polynomials*. Advances in Dynamical Systems and Applications, vol. 8 (2013), iss. 2, pp.181-192.

## Honors and Grants

Fulbright Scholar — 2026-2027
NAWI Graz, Austria

Faculty Fellow, Tidewater Project — 2022-2023
Center for Community Engagement, Christopher Newport University

Nominee, Alumni Society Award for Teaching and Mentorship — 2023
Christopher Newport University

Awardee, Faculty Excellence Award in Teaching — 2022
Christopher Newport University

Faculty Mentor, Preparation for Industrial Careers in Mathematics — 2018-2019
Mathematics Association of America

Participant, Mathematics Research Community — 2018
National Science Foundation, American Mathematical Society

Recipient, Mathematics Travel Grant — 2015
National Science Foundation, Association for Women in Mathematics

Recipient, Crosby Grant for Innovations in Teaching — 2015
Faculty Development Board, Goucher College

Awardee, Outstanding Graduate Student Instructor Award — 2013
Graduate School, Baylor University

Awardee, Outstanding Mathematics Graduate Teaching Award — 2010, 2011
Graduate School, Baylor University

Nominee, Outstanding Graduate Student Instructor Award — 2011
Graduate School, Baylor University

## Conference Organization

MathFest, Boston, MA — Aug 2026
Organizer of panel "Community-Engaged Learning in Undergraduate Mathematics: Models, Strategies, and Impact"

Center for Effective Teaching, CNU — Dec 2023
Organizer of workshop "Alternative Assessment Techniques"

MathFest, Chicago, IL — Jul 2017
Co-organizer of minicourse "Beyond Traditional Grading Schemes: Mastery Based Grading"

MathFest, Columbus OH — Aug 2016
Co-organizer of themed contributed session "Formative Assessment Techniques for Undergraduate Math Courses"

## Presentations

Fairfield Analysis and Differential Equations (FADE) Conference — Apr 2026
Plenary talk: *Exceptional Laguerre differential expressions: their formulation and spectral analysis*

Analysis Seminar; University of Delaware — Nov 2023
Invited talk: *The spectrum of self-adjoint extensions for exceptional Laguerre differential expressions*

MathFest; Tampa, FL — Aug 2023
Contributed talk: *Building a community-engaged mathematics learning experience*

Mastery Grading: University STEM Conference, Virtual — Jun 2022
Panelist: *Getting buy-in from your students*

Baylor Analysis Fest; Baylor University — May 2022
Invited talk: *A spectral exploration of exceptional Laguerre operators*

MD-DC-VA MAA Sectional Meeting; Salisbury University — Nov 2021
Workshop: *Creatively using our campuses: using everyday places and spaces to inspire mathematical problem formulation*

Mastery Grading: University STEM Conference, Virtual — Jun 2021
Panelist: *Getting buy-in from your students*

MathFest, Cincinnati, OH — Aug 2019
Contributed talk: *Intentional course design for project-based courses*

Department of Mathematics Colloquium; Mary Washington University — Mar 2019
Invited talk: *Gravity's action on light*

Joint Mathematics Meetings, Baltimore, MD — Jan 2019
Invited talk: *A refinement for the upper bound on the number of cusps in the case of single-plane microlensing*

MathFest, Denver, CO — Aug 2018
Contributed talk: *Enhancing a first-year calculus course with Mathematica assignments*

Elon University — May 208
Plenary talk: *Mathematics as Art, Art as Mathematics*

International Symposium on Orthogonal Polynomials, Special Functions and Applications, Canterbury, UK — Jul 2017
Contributed talk: *Moment representations for exceptional orthogonal polynomial systems*

Joint Mathematics Meetings, Seattle, WA — Jan 2017
Contributed talk: *The spectral analysis of the exceptional Hermite polynomials*

Colloquium, CNU — Nov 2016
Invited talk: *The exceptional Laguerre polynomials*

International Symposium on Orthogonal Polynomials, Special Functions, and Applications, Gaithersburg, MD — Jun 2015
Invited talk: *A study of the exceptional $X_m$-Jacobi expression for extreme parameter choices*

Joint Mathematics Meetings, San Antonio, TX — Jan 2015
Contributed talk: *A third type of exceptional Laguerre polynomials*

Wakonse South Conference on College Teaching, Burnet, TX — Apr 2014
Facilitator: *Teaching critical thinking*

Southeastern Analysis Meeting, Clemson University — Mar 2013
Contributed talk: *A third type of exceptional Laguerre polynomials*

Joint Mathematics Meetings, San Antonio, TX — Jan 2015
Contributed talk: *A new type of exceptional polynomials*

Joint Mathematics Meetings, San Diego, CA — Jan 2013
Contributed talk: *Spectral analysis of the $X_1$-Laguerre polynomials*

## Professional Development

Attendee, Inclusive Communities Faculty-led Discussion — 2024
SCHEV

Attendee, Using Inquiry to Teach Mathematics and Thinking — Sep 2022
SIGMAA Inquiry Based Learning

Contributor, Teaching Exchange — Jan 2020
Center for Effective Teaching, Christopher Newport University

Attendee, Course Design Workshop — Aug 2017
Center for Effective Teaching, Christopher Newport University

Attendee, "Engaging Students in the Classroom: Lessons from Motivation Theory" — Feb 2017
Center for Effective Teaching, Christopher Newport University

Participant, New Faculty Discussion — 2015-2016
Center for Effective Teaching, Christopher Newport University

Attendee, "Group Work: Making it Work for You and Your Students" — 2015-2016
Center for Effective Teaching, Christopher Newport University

Attendee, "Effective Lecture Techniques, Keeping Students Engaged" — 2015-2016
Center for Effective Teaching, Christopher Newport University

Fellow, Section NExT (New Experiences in Teaching) — 2014-2016
Mathematical Association of America, DC-MD-VA Section

Fellow, Project NExT (New Experiences in Teaching) — 2014-2016
Mathematical Association of America

## Undergraduate Research Students

Joanna Wright — 2024-2025
Project Title: *Visualization of Orthogonal Polynomials*

- Research Apprentice Program
- Poster Presentation, CNU Paideia
- Two published Wolfram Demonstrations

Nathan Hubinger — 2022
Project Title: *Fractional Calculus*

- Presentation, CNU Colloquium

Kelsey Priestaf — 2022
Project Title: *Importance of a Win in Volleyball*

- Presentation, CNU Colloquium

Michael Sparks — 2022
Project Title: *Optimal Control and Estimation*

Daniel Ferrante 2022
Project Title: *Gravitational Lensing*

- Summer Scholars program

Kaemon Watada 2020
Project Title: *Image Counting in Gravitational Lensing*

- Summer Scholars Program
- Poster Presentation, CNU Summer Scholars Symposium

Haley Eiser 2020
Project Title: *Mathematically Modeling the 2010 Gulf of Mexico Spill*

Ashley Christenbury, Jonathan Pilsch, Daniel Sims, and Kali White 2019-2020
Project Title: *Analysis of Newport News Fire Department Data*

- Preparation for Industrial Careers in Mathematics course
- Publication: *Preparation for Industrial Careers in Mathematics: Analysis of Newport News Fire Department*. Undergraduate Journal of Service Learning and Community-Based Research, vol. 9 (2020), pp. 29–72.

Adelyn Noble 2019
Project Title: *Outside the Box: Origami Optimization*

- Summer Scholars Program
- Poster Presentation, CNU Summer Scholars Symposium

Mariah Michael 2018-2019
Project Title: *Divisibility Properties of Sequences of Lucas Numbers*

- Poster Presentation, CNU Paideia
- Publication (with Spirit Karcher): *Prime Factors and Divisibility of Sums of Fibonacci and Lucas Numbers*. American Journal of Undergraduate Research, vol. 17 (2021), iss. 4.

Tera Meesawan 2019
Project Title: *Predictability of Traumatic Call Types in Newport News*

- Preparation for Industrial Careers in Mathematics course
- Poster Presentation, MathFest

Lindsey Dickens 2019
Project Title: *The Data Behind Teacher Strikes*

Spirit Karcher 2017-2018
Project Title: *Prime Factors and Divisibility Sums of Powers of Fibonacci Numbers*

- Presentation: MD-DC-VA MAA Sectional Meeting
  - Second place award for outstanding undergraduate presentation

- Publication (with Mariah Michael): *Prime Factors and Divisibility of Sums of Fibonacci and Lucas Numbers*. American Journal of Undergraduate Research, vol. 17 (2021), iss. 4.

Isaac Woods 2017
Project Title: *Functional Analysis*

Andrew Will 2016
Project Title: *Fractal Geometry*

## Courses Taught

- Elementary Statistics
- Mathematical Programming
- Math for the Life Sciences
- Precalculus
- Calculus for Business
- Calculus and Analytic Geometry
- Accelerated Calculus
- Intermediate Calculus
- Linear Algebra
- Proofs and Discrete Mathematics
- Real Analysis I, II
- Introduction to Differential Equations
- Intermediate Differential Equations
- Partial Differential Equations
- Mathematical Modeling
- Writing in Mathematics
- Mathematics in Context
- Capstone Course

## Select Leadership and Service

Chair 2024-Present
Budget Advisory Committee, Christopher Newport University

At-Large Member 2024-Present
MD-DC-VA Mathematical Association of America Section

Chair, Mathematics Outreach Committee 2022-Present
Department of Mathematics, Christopher Newport University

Contest Director, Regional High School Mathematics Competition 2016-2026
Department of Mathematics, Christopher Newport University

Member 2023-2025
MAA Committee on Student Concerns

Program Chair 2022-2025
Communities for Mathematics Inquiry in Teaching Network

Chair, Capstone Course Committee 2022-2024
Department of Mathematics, Christopher Newport University

Member, University Degrees Committee 2022-2024
Christopher Newport University

Member, Search Committee for Administrative Assistant Position 2022-2023
Department of Mathematics, Christopher Newport University

External Member, Departmental Review Committee — 2022-2023
Department of Psychology, Christopher Newport University

Chair, Writing Intensive Recertification Committee — 2021-2022
Department of Mathematics, Christopher Newport University

Member, Departmental Review Committee (1) — 2021-2022
Department of Mathematics, Christopher Newport University

Member, Departmental Review Committee (2) — 2021-2022
Department of Mathematics, Christopher Newport University

Chair, Curriculum Revision Committee (Differential Equations Sequence) — 2018-2021
Department of Mathematics, Christopher Newport University

Chair, Foundations Subcommittee — 2018-2021
Liberal Learning Council, Christopher Newport University

Member — 2016-2021
Liberal Learning Council, Christopher Newport University

External Member, Search Committee for Tenure-Track Position — 2019-2020
Dept. of Computer Science, Christopher Newport University

External Member, Search Committee for Lecturer Position — 2019-2020
Department of Mathematics, Christopher Newport University

Secretary — 2017-2018
Liberal Learning Committee, Christopher Newport University

Member, Search Committee for Tenure-Track Position — 2016-2017
Department of Mathematics, Christopher Newport University

Member, Search Committee for Tenure-Track Position — 2015-2016
Department of Mathematics, Christopher Newport University

Member, Annual Review Guidelines Committee — 2015-2016
Department of Mathematics, Christopher Newport University