[heatherw3521.github.io](http://heatherw3521.github.io)

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Heather D. Wilber

**EDUCATION**

Cornell University, Ithaca, NY PhD, Applied Mathematics May 2021

**Advisor: Prof. Alex Townsend**

**DISSERTATION:** *[Computing numerically with rational functions.](https://heatherw3521.github.io/phd_thesis.pdf)*

*(Awarded [AWM Dissertation Prize](https://awm-math.org/awards/awm-dissertation-prize/) 2022)*

Boise State Univ., Boise, ID M.S., Mathematics Aug 2016

**Advisor: Prof. Grady Wright**

**THESIS:** *[Numerical computing with functions on the sphere and disk](https://people.cam.cornell.edu/hdw27/msc_thesis.pdf).*

*(Selected as [Distinguished Thesis](https://www.boisestate.edu/graduatecollege/distinguished-scholarship-awards/) in STEM for 2016-2017)*

Boise State Univ., Boise, ID B.S., Mathematics Dec 2007

Boise State Univ., Boise, ID B.A., English-Linguistics Dec 2007

**CURRENT POSITION**

Oden Institute, University of Texas at Austin:NSF postdoctoral fellow, July 2021-present

**PUBLICATIONS**

*6.* Wilber, H., Damle, A., Townsend, A. *[Data-driven Algorithms for signal processing with rational functions.](https://arxiv.org/abs/2105.07324)* *SISC, to appear, (2022).*

*5.* Rubin, D., Townsend, A., Wilber, H. *[Bounding Zolotarev numbers using Faber rational functions.](https://arxiv.org/abs/1911.11882) Constructive Approx., submitted, (2020).*

4. Quinn, K., Wilber, H., Townsend, A., Sethna, J.P. *[Chebyshev approximation and the global geometry of model predictions](https://journals.aps.org/prl/abstract/10.1103/PhysRevLett.122.158302), Phy. Rev. Let., 122(15), 158302 (2019).*

*3.* Townsend, A., Wilber, H. *[On the singular values of matrices with high displacement rank](https://www.sciencedirect.com/science/article/abs/pii/S0024379518301009), Linear Alg. Appl., V. 548, 19-41 (2018).*

*2.* Wilber, H., Townsend, A., Wright, G. *[Computing with functions in spherical ands polar geometries II. The disk](https://epubs.siam.org/doi/abs/10.1137/16M1070207?journalCode=sjoce3). SIAM J. Sci. Comput., 39-3, C238-C262 (2017).*

*1.* Townsend, A., Wilber, H., Wright, G. *[Computing with functions in spherical and polar geometries I. The sphere](https://epubs.siam.org/doi/abs/10.1137/15M1045855?journalCode=sjoce3). SIAM J. Sci. Comput., 38-4, C403-C425 (2016).*

**PRESENTATIONS**

19. 2021 CONFERENCE ON FAST DIRECT SOLVERS (virtual)

*Talk: Designing low rank methods for matrices with displacement structure. (Oct. 2021)*

18. CCM SEMINAR SERIES, FLATIRON INSTITUTE (virtual)

*Talk: Designing low rank methods for matrices with displacement structure. (May 2021)*

17. GAMM 2021 (virtual)

Talk*: Compression properties and rank-structured solvers for Toeplitz, Vandermonde and related linear systems (March 2021)*

16. SIAM ANNUAL MEETING (virtual)

Talk*: Computing with rational approximations with applications in signal processing (July 2020)*

15. 27th BIENNIAL NUMERICAL ANALYSIS CONFERENCE (Univ. of Strathclyde, Strathclyde, UK)

Talk*:**Compression properties in rank-structured solvers for Toeplitz linear systems (June 2019)*

***Talk awarded SIAM UKIE prize: Best student presentation***

14. APPROXIMATION THEORY 16 (Vanderbilt University, Nashville, TN)

Talk*:**Rational approximation in superfast rank-structured solvers (May 2019)*

13. SCIENTIFIC COMPUTING AND NUM. ANALY. SEMINAR (Cornell University, Ithaca, NY)

Talk*:**Compression properties in rank-structured Toeplitz solvers**(April 2019)*

12. EPFL Numerical Analysis Group (EPFL, Lausanne, Switzerland)

Talk*:**Numerical computing in polar and spherical geometries**(Dec. 2018)*

11. EPFL Numerical Analysis Group (EPFL, Lausanne, Switzerland)

Talk*:**On the singular values of matrices with high displacement rank (Nov. 2018)*

10. ICOSAHOM (Imperial College London, UK)

Talk*:**A low rank and spectrally accurate elliptic PDE solver (July 2018)*

9. SCIENTIFIC COMPUTING AND NUM. ANALY. SEMINAR (Cornell University, Ithaca, NY)

Talk*:**On the singular values of matrices with high displacement rank (Oct. 2017)*

*8. CORNELL SCIENTIFIC SOFTWARE CLUB (Cornell University, Ithaca, NY)*

Talk*:**Computing with functions in Chebfun (Oct. 2017)*

7. SIAM CONF. ON COMPUTATIONAL SCIENCE AND ENGINEERING (Atlanta, GA)

Talk*:**A factored ADI method for Sylvester equations with high-rank right-hand sides (Feb. 2017)*

6. SIAM CONF. ON COMPUTATIONAL SCIENCE AND ENGINEERING (Atlanta, GA)

Poster*:**Numerical computing with functions in spherical and polar geometries (Feb. 2017)*

5. WORKSHOP ON FAST DIRECT SOLVERS (Purdue Univ., Lafayette, IN)

Talk*:**Numerical computing with functions on the sphere and disk (Nov. 2016)*

4. SCIENTIFIC COMPUTING AND NUM. ANALY. SEMINAR (Cornell University, Ithaca, NY)

Talk*:**Numerical computing with functions on the sphere and disk (Sept. 2016)*

3. SIAM ANNUAL MEETING (Boston, MA)

Talk: *Numerical computing in polar and spherical geometries (July 2016)*

2. OXFORD NUM. ANALYS. GROUP SEMINAR (University of Oxford, Oxford, UK)

Talk: *Computing with functions on the sphere and disk (July 2016)*

1. PACIFIC NORTHWEST NUMERICAL ANALYSIS SEMINAR

Poster*:**Computing with functions on the sphere and disk (Oct. 2015)*

**SOFTWARE DEVELOPMENT**

o [REfit](https://github.com/heatherw3521/REfit)

Open-source code for computing with trigonometric rational functions and exponential sums.

o [freeLyap](https://github.com/ajt60gaibb/freeLYAP) Iterative solvers package

Open-source code for solving Sylvester and Lyapunov matrix equations.

o [CHEBFUN PROJECT](https://www.chebfun.org/)

*Spherefun* and *Diskfun* in the open-source project *Chebfun*

**FELLOWSHIPS AND AWARDS**

o [AWM Dissertation Prize](https://math.cornell.edu/heather-wilber-awarded-awm-dissertation-prize) (2022)

o National Science Foundation Mathematical Sciences Postdoctoral Research Fellowship (2021)

o SIAM Student Travel Award (2020) \*Ultimately, I did not accept award as conference proceeded virtually and no funding was required.

o SIAM UKIE prize: Best student presentation, 27th Biennial Numerical Analysis conference (2019)

o Cornell University Dean’s Excellence Fellowship (2016-2017)

o National Science Foundation Graduate Research Fellowship (NSF GRF) (2016)

o [Distinguished Thesis Award](https://www.boisestate.edu/graduatecollege/distinguished-scholarship-awards/) (2017)

o SIAM Student Travel Award (2016)

o [National Aeronautics and Space Administration (NASA) Fellowship Award](https://www.boisestate.edu/coas/blog/2015/09/22/math-student-receives-prestigious-nasa-fellowship/) (2015-2016)

o Boise State Univ., Graduate Residential Scholars Fellowship Award (2014-2016)

o Boise State Univ., Summer Research Fellowship Award (2015)

**PROFESSIONAL ACTIVITIES**

o Referee: SIAM J. Scientific Computing, J. Comp. Physics, IMA J. of Num. Analysis, Archiv der Mathematik

o Minisymposium co-chair, SIAM Annual Meeting 2020, (Virtual). 2020

o Expanding Your Horizons outreach mentor 2019

o Rural schools outreach volunteer with National Aeronautics and Space Administration,

Science, Technology, Engineering and Mathematics Initiative (NASA STEM) 2015-2016

**TEACHING EXPERIENCE**

**Cornell University Ithaca, NY August 2020-Dec. 2020**

*Instructor*

o Spring 2021: Teaching Assistant for Prof. Steven Strogatz, Mathematical Explorations

o Fall 2020: Teaching Assistant for Prof. Alex Townsend, Linear Algebra for Engineers

**Boise State University Boise, Idaho August 2014-May 2015**

*Instructor*

o Spring 2015: Analytic Trigonometry

o Spring 2015: Trigonometry project and assessment design team member

o Fall 2014: Analytic Trigonometry, College Algebra

**Bruneau-Grandview School District Bruneau, Idaho August 2013-August 2014**

*High School Math Teacher*

o pre-algebra, algebra II, geometry, trigonometry, pre-calculus and Title-I interventionist