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Heather D. Wilber

EDUCATION

Cornell University, Ithaca, NY — PhD, Applied Mathematics — May 2021
Advisor: Prof. Alex Townsend

Boise State Univ., Boise, ID — M.S., Mathematics — Aug 2016
Advisor: Prof. Grady Wright
THESIS: *Numerical computing with functions on the sphere and disk.*
(Selected as Boise State University's Distinguished Thesis in STEM for 2016-2017)

Boise State Univ., Boise, ID — B.S., Mathematics (Magna Cum Laude) — Dec 2007
Boise State Univ., Boise, ID — B.A., English-Linguistics (Magna Cum Laude) — Dec 2007

PUBLICATIONS

5. Rubin, D., Townsend, A., Wilber, H. *Bounding Zolotarev numbers using Faber rational functions. Constructive Approx., submitted. (2020)*
4. Quinn, K., Wilber, H., Townsend, A., Sethna, J.P. *Chebyshev approximation and the global geometry of model predictions, Phy. Rev. Let., 122(15), 158302, (2019).*
3. Townsend, A., Wilber, H. *On the singular values of matrices with high displacement rank, Linear Alg. Appl., V. 548, 19-41 (2018).*
2. Wilber, H., Townsend, A., Wright, G. *Computing with functions in spherical and polar geometries II. The disk. 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. SIAM J. Sci. Comput., 38-4, C403-C425 (2016)*

PRESENTATIONS

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

- FI-ADI

Open-source code for solving Sylvester and Lyapunov eqns. in low rank form (2017)

- CHEBFUN PROJECT

Spherefun and *Diskfun* in the open-source project *Chebfun* (2015-2016)

FELLOWSHIPS AND AWARDS

- SIAM Student Travel Award (2020) *Ultimately, I did not accept award as conference proceeded virtually and no funding was required.
- SIAM UKIE prize: Best student presentation, 27th Biennial Numerical Analysis conference (2019)
- Cornell University Dean's Excellence Fellowship (2016-2017)
- National Science Foundation Graduate Research Fellowship (NSF GRF) (2016)
  Approximation strategies for fast neural computing and linguistic cognitive modeling
- Distinguished Thesis Award (2017)
- SIAM Student Travel Award (2016)
- National Aeronautics and Space Administration (NASA) Fellowship Award (2015-2016)
  Transforming computation in spherical geometries: fast and accurate algorithms using Fourier series and low rank approximation
- Boise State Univ., Graduate Residential Scholars Fellowship Award (2014-2016)
- Boise State Univ., Summer Research Fellowship Award (2015)
  Methods of low rank approximation for functions on the sphere
- Various undergraduate academic scholarships (Boise State Univ., Univ. of Idaho, 2003-2007)

PROFESSIONAL ACTIVITIES

- Minisymposium Organizer, SIAM Annual Meeting 2020, (Virtual).
- Referee for SIAM Journal on Scientific Computing.

TEACHING EXPERIENCE

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

Instructor

- Fall 2020: TA for Linear Algebra for Engineers (Math 2940)

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

- Spring 2015: Analytic Trigonometry (Math 144)
- Spring 2015: Trigonometry project and assessment design team member
- Fall 2014: Analytic Trigonometry (Math 144), College Algebra (Math 143)

Bruneau-Grandview School District **Bruneau, Idaho** **August 2013-August 2014**
High School Math Teacher

- pre-algebra, algebra II, geometry, trigonometry, pre-calculus and Title-I interventionist
- Member of school leadership team
- Designed project-based learning curriculum
- Co-wrote a grant to receive funds to start a robotics club and a STEM-discovery club

Education Writer **Istanbul, Turkey** **March 2011- August 2013**
Writer

- wrote textbook sections about teaching ESL courses, language phonology and English grammar

Park Su Hong English Academy **Changwon, South Korea** **July 14, 2011 – July 14, 2012**
English Language Teacher

- Middle school and High school English studies at various skill levels

Changnyeong English Village **Changnyeong, South Korea** **Nov. 5, 2010 – March 13, 2011**
English Language teacher

- Communicative method-based English courses for elementary and middle-school students Studied Korean grammar and phonology, developing materials and guides for teachers

Boise State University **Boise, ID** **March 2004 - Dec. 2007**
Tutor/researcher

- created and implemented a new math communications training program
- tutored students in trigonometry, differential equations, calculus, introductory proof writing/logic
- worked as a freshman and nontraditional student mentor

PERSONAL ACHIEVEMENTS

- Rural schools outreach volunteer with National Aeronautics and Space Administration, Science, Technology, Engineering and Mathematics Initiative (NASA STEM) 2015-2016
- Volunteer teacher/mentor in Changwon Dongbowon Orphanage, South Korea 2011-2012
- Volunteer community tutor 2006-2007

WORK EXPERIENCE

Oregon Social Learning Center **Eugene, OR** **Oct. 1, 2008 – Oct. 1, 2010**
Data analyst/data manager
Projects

- The Relationship Study 1 and The Relationship Study 2 (PI: Dr. Leslie Leve)
- The Relationship Study 3 (PI: Dr. Leslie Leve)
- Middle School Girls Success (PI: Dr. Leslie Leve)
- San Diego Foster Care Study (PI: Dr. Patricia Chamberlain)