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### Education & Training

Postdoctoral Associate, September 2011 – April 2014

Massachusetts Institute of Technology  
Dept. of Mathematics, and  
Earth Resources Laboratory (by courtesy)  
Advisor: Laurent Demanet

Ph.D. in Computer Science (w/ Computational Science & Engineering option), December, 2011

University of Illinois at Urbana-Champaign  
Thesis: *Numerical Methods for Solar Tomography in the STEREO Era*  
Advisors: Michael T. Heath and Farzad Kamalabadi

B.S. *in Honors* in Computer Science, *Summa Cum Laude*, May, 2005

Virginia Polytechnic Institute and State University (Virginia Tech)  
Thesis: *Wavelet Analysis of Solar Active Regions*  
Advisors: Calvin Ribbens and Peter T. Gallagher

### Academic & Industrial Experience

Aug 2018–Present	Assistant Professor, Department of Mathematics, Virginia Tech
Aug 2018–Present	Affiliate Faculty in Computational Modeling & Data Analytics, Virginia Tech
Jul 2017–Aug 2018	Chef de Projet (R&D Project Manager) for Inverse Problems, Uncertainty Quantification, and Machine Learning Project, Total E&P Research and Technology USA
May 2014–Aug 2018	Research Scientist, Computational Science & Engineering Department, Total E&P Research and Technology USA

### Fellowships and Grants

2021	DOE Office of Science Early Career Research Program award, for <i>Domain-decomposition induced parallelism for scientific deep learning at extreme scale</i> (\$750,000)
2021	Lay Nam Chang Dean's Discovery Fund, for <i>Deep learning for non-linear common-factor modeling and forecasting in economics</i> (\$20,000)
2021	CMDA Undergraduate Research Grant, for <i>Domain Decomposition for Residual Neural Networks</i> (\$1,250)
2021	CMDA Undergraduate Research Grant, for <i>A Scalable Universal Tensor Multiplication Algorithm for Distributed Deep Learning</i> (\$1,250)
2019	Luther and Alice Hamlett Undergraduate Research Support, for <i>HPC Applications in machine learning</i> (\$2,000)
2008–2011	NASA Graduate Student Research Program (GSRP) Fellowship (\$90,000)

### Other Research History and Relevant Work Experience

Jan 2008–Jul 2011	Graduate Research Assistant, University of Illinois at Urbana-Champaign
Jun 2007–Aug 2007	Graduate Research Assistant, University of Illinois at Urbana-Champaign
Jun 2006–Sep 2006	Visiting Student, Trinity College Dublin
Sep 2004–Sep 2006	Junior Programmer, L3-Communications GSI, NASA Goddard Space Flight Center
May 2004–Aug 2004	Student Intern, NASA Goddard Space Flight Center
May 2003–Aug 2003	Student Intern, NASA Goddard Space Flight Center
Jun 2000–Aug 2001	Student Intern, NASA Goddard Space Flight Center

**Teaching Experience**

- Fall 2021 Instructor, CMDA 3634 (2 sections) CS Foundations of CMDA, Virginia Tech
- Fall 2021 Co-organizer, Math Dept. Reading Group on Math of Machine Learning, Virginia Tech
- Spring 2021 Instructor, CMDA 3634 (2 sections) CS Foundations of CMDA, Virginia Tech
- Fall 2020 Co-organizer, Math Dept. Reading Group on Math of Machine Learning, Virginia Tech
- Spring 2020 Instructor, CMDA 3634 CS Foundations of CMDA, Virginia Tech
- Fall 2019 Instructor, MATH 5984, Extreme-scale Inverse Problems, Virginia Tech
- Fall 2019 Instructor, CMDA 2006 Integrated Quantitative Science, Virginia Tech
- Spring 2019 Instructor, CMDA 3634 CS Foundations of CMDA, Virginia Tech
- Fall 2018 Instructor, CMDA 2006 Integrated Quantitative Science, Virginia Tech
- Fall 2018 Guest Lecturer, CS 6804 Physics and Machine Learning, Virginia Tech
- Spring 2013 Recitation Instructor, 18.06 Linear Algebra, Massachusetts Institute of Technology
- Spring 2013 Co-organizer, Earth Resources Laboratory Reading Group on Full Waveform Inversion, Massachusetts Institute of Technology
- Fall 2012 Guest Lecturer, 18.325 Special Topics in Applied Mathematics: Waves and Imaging, Massachusetts Institute of Technology
- Fall 2010 Guest Lecturer, CS498dwh Computational Photography, University of Illinois
- Fall 2007 Teaching Assistant, CS450 Intro to Numerical Analysis (U/G), University of Illinois
- Spring 2007 Teaching Assistant, CS450 Intro to Numerical Analysis (U/G), University of Illinois
- Fall 2006 Teaching Assistant, CS450 Intro to Numerical Analysis (U/G), University of Illinois
- Spring 2006 Teaching Assistant, CS450 Intro to Numerical Analysis (U/G), University of Illinois
- Fall 2005 Teaching Assistant, CS232 Intro to Computer Architecture II, University of Illinois

**Invited Lectures & Summer Schools**

- Oct 2021 *Applied and Computational Mathematics Seminar*, University of Wisconsin, Online
- Sep 2021 *AMD HPC Seminar*, AMD, Online
- Jul 2021 *Modeling @ Alphabet*, Alphabet/Google, Online
- Feb 2021 *SLIM Seminar*, Georgia Tech, Online
- Dec 2019 *Department of Mathematics Numerical Analysis Seminar*, University of Maryland, College Park, MD, USA
- Apr 2019 Invited Lecturer, *Theory and experience in solving inverse problems in geophysics workshop*, Uppsala University, Uppsala, Sweden
- Sep 2018 Invited Instructor, *Summer School on Full Waveform Inversion: Mathematics and Geophysics*, Karlsruhe Institute of Technology, Karlsruhe, Germany
- Nov 2014 *Computational and Applied Mathematics Seminar*, Rice University, Houston, TX, USA
- Nov 2014 *Scientific Computing Seminar*, University of Texas at Dallas, Dallas, TX, USA
- Apr 2014 *Princeton Geophysics Brownbag*, Princeton University, Princeton, NJ, USA
- Jul 2013 Instructor for Computational Exercises, *Summer School on Introduction to the Mathematics of Seismic Imaging*, Mathematical Sciences Research Institute (MSRI), Berkeley, CA, USA
- Apr 2013 MIT Haystack Observatory, Massachusetts Institute of Technology, Burlington, MA, USA
- Nov 2011 *MIT Camera Culture Group Seminar*, Media Lab, Massachusetts Institute of Technology, Cambridge, MA, USA
- Feb 2011 *Imaging and Computing Seminar*, Department of Mathematics, Massachusetts Institute of Technology, Cambridge, MA, USA

**Workshops and Minisymposia**

- Mar 2021 Co-organizer, minisymposium, "Parallel Computing Models for Distributed Deep Learning," at 2021 Conference on Computational Science and Engineering
- Nov 2020 Member, Program committee for AAAI 2020 Fall Symposium on Physics-guided AI, 2020.
- Jul 2020 Co-organizer, minisymposium, "Advances in Uncertainty Quantification for Subsurface Inverse Problems," at 2020 SIAM Conference on Imaging Science, Online
- Feb 2017 Co-organizer, minisymposium, "Numerical and computational challenges in high order DG methods," at 2017 SIAM Conference on Computational Science and Engineering, Atlanta, GA
- May 2016 Co-convenor, workshop, "Open-source Software in Applied Geosciences," at 78th EAGE Conference & Exhibition 2016, Vienna, Austria
- Jun 2015 Co-organizer, minisymposium, "Advances in Software for Computational Geosciences," at 2015 SIAM Conference on Mathematical & Computational Issues in the Geosciences, Palo Alto, CA
- Jun 2015 Co-organizer, minisymposium, "Discontinuous Galerkin Methods in Seismology," at 2015 SIAM Conference on Mathematical & Computational Issues in the Geosciences, Palo Alto, CA
- Apr 2011 Co-organizer, Python for Science and Engineering Workshop, University of Illinois
- Oct 2010 Co-organizer, Python for Scientific Computing Workshop, University of Illinois

**Current Students**

June 2020– Present	Joseph Weissman, Graduate Student, Dept. of Mathematics, Virginia Tech on multi-grid methods for Gaussian process modeling
August 2020– Present	Dawson Miller, Graduate Student, Dept. of Mathematics, Virginia Tech on time-dependent deep learning for model reduction in economics and finance
August 2020– Present	Daniel Hajjaligol, Undergraduate Student, CMDA, Virginia Tech on distributed deep learning
January 2021– Present	Xuanjie Chen, Undergraduate Student, CMDA, Virginia Tech on distributed deep learning

**Past Students**

July 2021– August 2021	Bill Norris, Undergraduate Student, CMDA, Virginia Tech on deep learning for ecology
August 2019– June 2021	ThaoVy Nguyen, Graduate Student, Dept. of Mathematics, Virginia Tech on deep learning for data assimilation in ecological modeling
Fall 2020	Ananiya Admasu, Mason Beahr, & Sarah Kauffman, CMDA Senior Capstone team on parallelizing U-net architectures
August 2020– December 2020	Jacob Merizian, Undergraduate Student, Dept. of Mathematics, Virginia Tech on distributed deep learning with ResNets
August 2019– May 2020	Thomas Grady, Undergraduate Student, CMDA, Virginia Tech on distributed deep learning
Summer 2018	Gaetan Fuss, VIE with Computational Science & Engineering Department at TOTAL E&P Research & Technology, USA (TOTAL), on geometric constraints for full waveform inversion
Summer 2017	Kailai Xu, intern with Computational Science & Engineering Department at TOTAL E&P Research & Technology, USA (TOTAL), on fast solvers for the Helmholtz equation
Summer 2016	Zheng Wang, intern with Computational Science & Engineering Department at TOTAL E&P Research & Technology, USA (TOTAL), on multirate time stepping DG methods for the wave equation and DG methods in imaging and inversion
Summer 2016	Peter Geldermans, intern with Computational Science & Engineering Department at TOTAL E&P Research & Technology, USA (TOTAL), on HPS solvers for the Helmholtz equation and applications to imaging and inversion
Summer 2015– Summer 2016	Kevin Tuil, VIE with Computational Science & Engineering Department at TOTAL E&P Research & Technology, USA (TOTAL), on computational and numerical aspects of full waveform inversion
Summer 2014– Fall 2014	Mamadou N'diaye, VIE with Computational Science & Engineering Department at TOTAL E&P Research & Technology, USA (TOTAL), on optimizing finite difference coefficients for wave equations
Summer 2013	Léopold Cambier, intern with Imaging and Computing Group at MIT on applications of matrix probing to the full waveform inversion Hessian
Summer 2013	Christine Cutting, intern with Imaging and Computing Group at MIT on uncertainty quantification and stochastic Newton methods for seismic imaging
Summer 2012	Minghua “Michel” Rao, intern with Imaging and Computing Group at MIT on locally one-dimensional methods for wave equations

**M.S. Thesis Committees**

2021	( <i>anticipated</i> ) Chair, Dawson Miller, Virginia Tech
2021	( <i>anticipated</i> ) Co-chair, Joseph Weissman, Virginia Tech
2021	Chair, ThaoVy Nguyen, Virginia Tech
2021	Member, Joseph Kump, Virginia Tech

**Ph.D. Thesis Committees**

2015 Marie Bonhassé-Gahot, University of Nice, France

**Refereed Journal Publications**

**R. J. Hewett**, T. Grady II, and J. Merizian, "Parallel Primitives for Domain Decomposition in Neural Networks," *in review* IEEE Transactions on Parallel and Distributed Systems, Special Section on Parallel and Distributed Computing Techniques for AI, ML, and DL, September, 2021.

N. K. Ward, J. A. Brentrup, D. C. Richardson, K. C. Weathers, P. C. Hanson, **R. J. Hewett**, C. C. Carey, "Physical characteristics of the stream – lake transitional zone affect littoral lake metabolism," *in review* Aquatic Sciences, June, 2021.

M. Taus, L. Zepeda-Núñez, **R. J. Hewett**, and L. Demanet, "L-Sweeps: A scalable, parallel preconditioner for the high-frequency Helmholtz equation," *Journal of Computational Physics*, 420, November, 2020.

M. Bobra, S. Mumford, **R. J. Hewett**, S. D. Christe, K. Reardon, S. Savage; J. Ireland; T. M. D. Periera; B. Chen; D. Pérez-Suárez, "A Survey of Computational Tools in Solar Physics," *Solar Physics*, Volume 295, April, 2020.

The SunPy Community, W. Barnes, M. Bobra, . . . , **R. J. Hewett**, et al., "The SunPy Project: Open Source Development and Status of the Version 1.0 Core Package," *The Astrophysical Journal*, 890 (1), February, 2020.

N. Beams, A. Gillman, and **R. J. Hewett**, "A parallel implementation of a high order accurate solution technique for variable coefficient Helmholtz problems," *Computers and Mathematics with Applications*, 79 (4), February, 2020.

S. Mumford, N. Freij, S. Christe, . . . , **R. J. Hewett**, et al., "SunPy: a python package for solar physics," *Journal of Open Source Software*, 5 (46), February, 2020.

L. Zepeda-Núñez, A. Scheuer, **R. J. Hewett**, and L. Demanet, "The Method of Polarized Traces for the 3D Helmholtz Equation," *Geophysics*, 84 (4), T313-T333, July, 2019.

J. Chan, **R. J. Hewett**, Z. Wang, and T. Warburton, "Reduced Storage Nodal Discontinuous Galerkin Methods on Semi-structured Prismatic Meshes," *Computers & Mathematics with Applications*, 73 (5), 775-793, March, 2017.

J. Chan, **R. J. Hewett**, and T. Warburton, "Weight Adjusted Discontinuous Galerkin Methods: Curvilinear Meshes," *SIAM Journal on Scientific Computing*, 39 (6), A2395-A2421, January, 2017.

J. Chan, **R. J. Hewett**, and T. Warburton, "Weight Adjusted Discontinuous Galerkin Methods: Wave Propagation in Heterogeneous Media," *SIAM Journal on Scientific Computing*, 39 (6), A2935-A2961, January, 2017.

The SunPy Community, S. J. Mumford, S. Christe, D. Pérez-Suárez, J. Ireland, A. Y. Shih, A. R. Inglis, S. Liedtke, **R. J. Hewett**, F. Mayer, K. Hughitt, N. Freij, T. Meszaros, S. M. Bennett, M. Malocha, J. Evans, A. Agrawal, A. J. Leonard, T. P. Robitaille, B. Mampaey, J. Iván Campos-Rozo, and M. S. Kirk, "SunPy–Python for solar physics," *Computational Science and Discovery*, Volume 8, Issue 1, January 2015.

**R. J. Hewett**, I. H. Jermyn, M. T. Heath, and F. Kamalabadi, "A Phase Field Method for Tomographic Reconstruction from Limited Data," *Proceedings of the British Machine Vision Conference*, pp. 120.1-120.11, August, 2012.

R. A. Frazin, A. M. Vázquez, W. T. Thompson, **R. J. Hewett**, P. Lamy, A. Llebaria, A. Vourlidas, and J. Burckpile, "Intercomparison of the LASCO-C2, SECCHI-COR1, SECCHI-COR2, and Mk4 Coronagraphs," *Solar Physics*, Volume 280, Issue 1, pp. 273-293, 2012.

**R. J. Hewett**, M. T. Heath, M. D. Butala, and F. Kamalabadi, "A Robust Null Space Method for Linear Equality Constrained State Estimation," *IEEE Transactions on Image Processing*, Volume 58, Issue 8, pp. 3961-3971, August, 2010.

M. D. Butala, **R. J. Hewett**, R. A. Frazin, and F. Kamalabadi, "Dynamic Three-Dimensional Tomography of the Solar Corona," *Solar Physics*, Volume 262, Issue 2, pp. 495-509, February, 2010.

J. Ireland, C. A. Young, R. T. J. McAteer, C. Whelan, **R. J. Hewett**, and P. T. Gallagher, "Multiresolution Analysis of Active Region Magnetic Structure and Its Correlation with the Mt. Wilson Classification and Flaring Activity," *Solar Physics*, Volume 252, Issue 1, pp. 121-137, August, 2008.

**R. J. Hewett**, P. T. Gallagher, R. T. J. McAteer, C. A. Young, J. Ireland, P. A. Conlon, and K. Maguire, "Multiscale Analysis of Turbulence in Active Regions Using Wavelets," *Solar Physics*, Volume 248, Issue 2, pp. 297-309, April, 2008.

P. A. Conlon, P. T. Gallagher, R. T. J. McAteer, J. Ireland, C. A. Young, P. Kestener, **R. J. Hewett**, and K. Maguire, "Multifractal Properties of Evolving Active Regions," *Solar Physics*, Volume 248, Issue 2, pp. 311-322, April, 2008.

### Preprints

**R. J. Hewett** and T. Grady II, "A Linear Algebraic Approach to Model Parallelism in Deep Learning," <https://arxiv.org/abs/2006.03108>, June, 2020.

### Conference Proceedings

L. Zepeda-Núñez, M. Taus, **R. J. Hewett**, and L. Demanet, "An accurate, fast, and scalable solver for high-frequency wave propagation," AGU Fall Meeting Abstracts, December, 2017.

L. Zepeda-Núñez, L. Demanet, **R. J. Hewett**, and A. Scheuer, "A short note on a pipelined polarized-trace algorithm for 3D Helmholtz," 86th Annual Meeting, SEG, Expanded Abstracts, October, 2016.

M. N'Diaye, **R. J. Hewett**, A. Atle, and H. Calandra, "Optimized finite difference coefficients for the Helmholtz equation," 85th Annual Meeting, SEG, Expanded Abstracts, October, 2015.

L. Zepeda-Núñez, **R. J. Hewett**, and L. Demanet, "Preconditioning the 2D Helmholtz equation with polarized traces," 84th Annual Meeting, SEG, Expanded Abstracts, October, 2014.

L. Zepeda-Núñez, **R. J. Hewett**, M. Rao, and L. Demanet, "Time-stepping beyond CFL: a locally one-dimensional scheme for acoustic wave propagation," 83rd Annual Meeting, SEG, Expanded Abstracts, September, 2013.

M. Leinonen, **R. J. Hewett**, X. Zhang, L. Ying, and L. Demanet, "High-dimensional wave atoms and compression of seismic datasets," 83rd Annual Meeting, SEG, Expanded Abstracts, September, 2013.

S. Mumford, D. Pérez-Suárez, S. Christe, F. Mayer, and **R. J. Hewett**, "SunPy: Python for Solar Physicists," Proceedings of the 12th Python in Science Conference, July, 2013.

R. T. J. McAteer, P. T. Gallagher, J. Ireland, C. A. Young, **R. J. Hewett**, and P. Conlon, "The Complex Sun: Turbulence and Complexity of the Solar Atmosphere," *SOHO-17. 10 Years of SOHO and Beyond*, 2006.

**Book Chapters**

B. Hewett and **R. J. Hewett**, *IM Talking about Literacy: Instant Messaging in the Workplace*, in *Handbook of Research on Virtual Workplaces and the New Nature of Business Practices*. Eds.: Kirk St. Amant and Pavel Zemliansky. Hershey, PA, USA: IGI Global, 2008.

P. T. Gallagher, R. T. J. McAteer, C. A. Young, J. Ireland, **R. J. Hewett**, and P. A. Conlon, *Solar Activity Monitoring*, in *Space Weather: Research Towards Applications in Europe*. Ed.: Jean Lilensten. Dordrecht, The Netherlands: Springer, 2007.

**Conference Talks as Primary Contributor**

**R. J. Hewett**, "Parallel Primitives for Domain Decomposition in Deep Learning," *Total MATHIAS Days*, Paris, France, October 2021.

**R. J. Hewett**, "A Linear Algebraic Framework for Distributed Deep Learning," *SIAM CSE 2021*, Online, March 2021.

**R. J. Hewett**, "Toward UQ in subsurface recovery," *SIAM IS 2020*, Online, July 2020.

**R. J. Hewett**, "Neural Network Priors and Full-waveform Inversion," *3rd Machine Learning in Solid Earth Geoscience Conference*, Santa Fe, NM, March 2020, *Cancelled due to COVID-19*.

**R. J. Hewett**, M. Taus, L. Zepeda-Núñez, L. Demanet, "L-sweeps: A scalable parallel high-frequency Helmholtz solver," *Total MATHIAS Days*, Paris, France, October 2019.

**R. J. Hewett**, M. Taus, L. Zepeda-Núñez, L. Demanet, "L-sweeps: A scalable parallel high-frequency Helmholtz solver," *SIAM CSE 2019*, Spokane, WA, February 2019.

**R. J. Hewett** "PySIT: Seismic Imaging Toolbox for Python," *SIAM Geoscience 2015*, Stanford University, Palo Alto, CA, June 2015.

**R. J. Hewett**, L. Zepeda-Núñez, and L. Demanet, "A Polarized-Trace Solver for 2D Helmholtz and Frequency Domain Full-Waveform Inversion," *Inverse Problems: Theory and Applications*, Bristol, UK, August 2014.

**R. J. Hewett**, I. Jermyn, M. T. Heath, and F. Kamalabadi, "Toward Tomographic Reconstruction of CMEs with a Phase Field Method," *Solar Image Processing Workshop VI*, Bozeman, MT, August 2012.

**R. J. Hewett**, "Tomographic Imaging of the Solar Corona from Multi-spacecraft Measurements," *Goddard Space Flight Center Graduate Student Symposium*, Greenbelt, MD, September 2010.

**R. J. Hewett** and W. K. Cochran, "Computing Tomographic Projection Operators on Unstructured Meshes," *SIAM Imaging Science 2010*, Chicago, IL, April 2010.

**R. J. Hewett**, M. D. Butala, F. Kamalabadi, and R. A. Frazin, "Dynamic 3D Coronal Density Reconstructions with Data from Multiple Observatories," *Solar Image Processing Workshop IV*, Baltimore, MD, October 2008.

**R. J. Hewett**, P. T. Gallagher, R. T. J. McAteer, C. A. Young, J. Ireland, P. A. Conlon, and K. Maguire, "Multiscale Analysis of Turbulence in Active Regions Using Wavelets," *Solar Image Processing Workshop III*, Dublin, Ireland, September 2006.

**Conference Posters as Primary Contributor**

**R. J. Hewett**, I. Jermyn, F. Kamalabadi, and M. T. Heath, "Joint Tomography and Segmentation of Coronal Mass Ejections," *Solar Image Processing Workshop V*, Les Diablerets, Switzerland, September

2010.

**R. J. Hewett**, M. D. Butala, F. Kamalabadi, and O. C. St.Cyr, "Large Scale Dynamic Reconstruction of Coronal Density and Temperature from Multi-spacecraft Measurements," *Goddard Space Flight Center Graduate Student Symposium*, Greenbelt, MD, September 2009.

**R. J. Hewett**, P. T. Gallagher, R. T. J. McAteer, C. A. Young, and J. Ireland, "Multiscale Structure of Active Region Magnetic Fields: A Continuous Wavelet Approach," *American Astronomical Society: Solar Physics Division Annual Meeting*, Durham, NH, June 2006.

#### Other Conference Presentations

L. Zepeda-Núñez, L. Demanet, **R. J. Hewett**, "L-Sweeps: An Optimally Scalable Solver for the High-Frequency Helmholtz Equation," *SIAM Computational Science and Engineering 2021*, Online, March 2021.

S. A. Murray, W. Barnes, M. Bobra, . . . , **R. J. Hewett**, et al., "SunPy 2.0: the community-developed open-source solar data analysis environment for Python," *AGU Fall Meeting 2020*, Online, December 2020.

S. A. Murray, W. Barnes, M. Bobra, . . . , **R. J. Hewett**, et al., "SunPy 2.0: the community-developed open-source solar data analysis environment for Python," *AGU Fall Meeting 2020*, Online, December 2020.

T. Grady, **R. J. Hewett**, "Toward model parallel physics-informed neural networks for seismic inversion," *3rd Machine Learning in Solid Earth Geoscience Conference*, Santa Fe, NM, March 2020, *Cancelled due to COVID-19*.

M. Taus, L. Zepeda-Núñez, **R. J. Hewett**, L. Demanet, "An Accurate, Fast, and Scalable Solver for High-frequency Wave Propagation," 13th World Congress on Computational Mechanics, New York, NY, July 2018.

L. Zepeda-Núñez, M. Taus, **R. J. Hewett**, L. Demanet, "An Accurate, Fast, and Scalable Solver for High-frequency Wave Propagation," 25th International Domain Decomposition Conference, New York, NY, July 2018.

N. Beams, A. Gillman, **R. J. Hewett**, "A Parallel Implementation of a Hierarchical Spectral Solver for Variable Coefficient Elliptic Partial Differential Equations," International Conference on Spectral and High Order Elements, London, UK, July, 2018.

N. Beams, A. Gillman, **R. J. Hewett**, "A parallel implementation of a high order accurate variable coefficient Helmholtz solver," SIAM Conference on Applied Linear Algebra, Hong Kong, May, 2018.

N. Beams, A. Gillman, **R. J. Hewett**, "A parallel implementation of a high order accurate variable coefficient Helmholtz solver," Rice Oil & Gas HPC Conference, Houston, TX, March, 2018.

L. Demanet, L. Zepeda-Núñez, **R. J. Hewett**, M. Taus, and A. Scheuer, "The Method of Polarized Traces for the Helmholtz Equation," *SIAM Annual Meeting 2016*, Boston, MA, July 2016.

F. Kamalabadi, **R. J. Hewett**, and M. D. Butala, "Time-Dependent Tomographic Imaging of the Solar Atmosphere," *SIAM Imaging Science 2010*, Chicago, IL, April 2010.

F. Kamalabadi, **R. J. Hewett**, M. D. Butala, and R. A. Frazin, "An Assimilative 3-D Model of Coronal Density from Multi-Spacecraft Observations," *Eos Transactions of the American Geophysical Union*, Volume 90, Issue 52, Fall Meeting Supplement, San Francisco, CA, December 2009.

M. D. Butala, **R. J. Hewett**, R. A. Frazin, Y. Chen, and F. Kamalabadi, "Reconstruction of the Dynamic 3D Solar Atmosphere with the Ensemble Kalman Filter," *Solar Image Processing Workshop IV*, Baltimore,



MD, October 2008.

P. A. Conlon, P. T. Gallagher, R. T. J. McAteer, C. A. Young, J. Ireland, **R. J. Hewett**, and K. Maguire, "Multifractal Analysis of Solar Magnetograms," *Solar Image Processing Workshop III*, Dublin, Ireland, September 2006.

### Other Research Artifacts

**R. J. Hewett** and T. Grady, "DistDL: Distributed Deep Learning for PyTorch," 2020-present, DOI: 10.5281/zenodo.3990528

**R. J. Hewett**, L. Demanet, and the PySIT Team, "PySIT: Python Seismic Imaging Toolbox v1.0," 2013-2020, DOI: 10.5281/zenodo.3603367

M. Taus, L. Zepeda-Núñez, **R. J. Hewett**, L. Demanet, "L-Sweeps-2D," 2019, DOI: 10.5281/zenodo.3383883

M. Taus, L. Zepeda-Núñez, **R. J. Hewett**, L. Demanet, "L-Sweeps-2D-examples," 2019, DOI: 10.5281/zenodo.3383923

### Honors, Awards, and Outstanding Achievements

- 2005 First Place Industry Choice Award in Virginia Tech Undergraduate Research in Computer Science for "Wavelet analysis of solar active regions"
- 2005 Phi Beta Kappa
- 2004 Upsilon Pi Epsilon
- 2001 First Place Judge's Choice Award in Virginia Tech Undergraduate Research in Computer Science for "The design and implementation of a refineable keyword search engine," w/ D. Arendt and J. Giacalone

### Software Contributions

DistDL: Distributed Deep Learning for PyTorch, lead designer and developer. Released under BSD license, June 8, 2020. ([github.com/distdl](https://github.com/distdl))

R&D Performance Seismic Inversion Suite for Total SA, proprietary, Architect and Developer

PySIT: Python Seismic Imaging Toolbox, lead designer and developer. Released under BSD license, November 22, 2013. ([www.pysit.org](http://www.pysit.org))

SunPy: A Community Python Library for Solar Physics, contributor and member of the Board of Directors. ([www.sunpy.org](http://www.sunpy.org))

Minor contributions: AstroPy, NumPy, Hugo Academic

### Professional Service

Member of the Board of Directors, SunPy project, 2014 – Present.

Participant, SEG SEAM AI project, as academic representative and representative of CSE Dept. at TOTAL, 2018-2019.

Committee Member, Numerics and Acquisition Committee, SEG SEAM Pore Pressure Prediction project, as representative of CSE Dept. at TOTAL, 2016.

Program Committee Member, Solar Astronomy Big Data (SABiD) – 1st Workshop on Management, Search and Mining of Massive Repositories of Solar Astronomy Data, IEEE BigData 2014, October 2014.

Executive Secretary, NASA Living With a Star/NSF Collaborative Space Weather Modeling Program Review Panel, September 2012.

Article referee for *SIAM Journal of Applied Mathematics*, *Geophysics*, *IEEE Transactions on Signal Processing*, *Applied Mathematics and Computation*, *Automatica*, *IEEE Transactions on Aerospace and Electronic Systems*, and *Journal of Systems and Control Engineering*.

**University Service**

Committee Member, Math Department Computing Committee, Virginia Tech, August 2020 – Present.

Committee Member, CMDA Computation Curriculum Development Committee, August 2018 – Present.

Committee Member, Math Department Colloquium Committee, Virginia Tech, August 2018 – August 2020.

Search Committee Member, CMDA Professor of Practice, Virginia Tech, November 2018 – April 2019.

**Skills, Programming Languages, and Tools**

Programming Languages & Frameworks: Python, PyTorch, C, Fortran, C++, MPI, OpenMP, CUDA, LaTeX

Version Control & Project Management: git, JIRA, BitBucket, GitHub, GitLab, hg

Languages: English (native), French (basic)

Other: Woodworking, panoramic photography, 3D printing

**References**

Upon request.