

Daniel Appelö

Curriculum Vitae

Last update: July 24, 2026
Department of Mathematics
CMDA (Computational Modeling and Data Analytics) program
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Employment

- 2023– **Professor**, *Department of Mathematics, Virginia Tech., USA*
- 2020–2023 **Associate Professor**, *Department of Computational Mathematics, Science & Engineering and Department of Mathematics, Michigan State University, USA*
- 2017–2020 **Associate Professor in Applied Mathematics**, *University of Colorado Boulder, USA*
- 2017, 2018 **Visiting Professor in Scientific Computing (Summers)**, *Uppsala University, Uppsala, Sweden*
- 2019, 2022 **Visiting Professor in Scientific Computing (Summers)**, *Uppsala University, Uppsala, Sweden*
- 2016–2017 **Associate Professor in Applied Mathematics**, *The University of New Mexico, Albuquerque, USA*
- 2011–2016 **Assistant Professor in Applied Mathematics**, *The University of New Mexico, Albuquerque, USA*
- 2008–2011 **Postdoctoral scholar in Mechanical Engineering**, *California Institute of Technology, Pasadena, USA, Advisor: Prof. Tim Colonius*
- 2008–2009 **Postdoctoral scholar in Applied Computational Mathematics**, *California Institute of Technology, Pasadena, USA, Advisor: Prof. Oscar Bruno*
- 2006–2008 **Postdoctoral fellow**, *Center for Applied and Scientific Computing, Lawrence Livermore Nat. Lab., Livermore, USA, Advisor: Dr. Anders Petersson*
- 2006–2006 **Hans Werthen Prize postdoctoral scholar**, *The University of New Mexico, Albuquerque, USA, Advisor: Prof. Thomas Hagstrom*
- 2001–2006 **Graduate student in Numerical Analysis**, *Royal Institute of Technology, Stockholm, Sweden*

Education

- 2001–2006 **Ph.D. Numerical Analysis**, *Royal Institute of Technology, Stockholm, Sweden, Absorbing Layers and Non-Reflecting Boundary Conditions for Wave Propagation Problems*
Advisor: Prof. Gunilla Kreiss
- 2001–2003 **Licenciates degree in Numerical Analysis**, *Royal Institute of Technology, Stockholm, Sweden, Non-reflecting Boundary Conditions for Wave Propagation Problems*
Advisor: Prof. Gunilla Kreiss
- 1996–2001 **M.S. Electrical Engineering**, *Royal Institute of Technology, Stockholm, Sweden*

Professional Recognition

- 2025 **Lawrence Livermore National Laboratory Faculty Mini-Sabbatical Program (declined due to HR reasons)**
- 2025 **SLMath Complementary Program**
- 2024 **Institute for Computational and Experimental Research in Mathematics (ICERM), Providence, RI, USA., Semester program Numerical PDEs: Analysis, Algorithms, and Data Challenges**

- 2019 **Program for Mathematics 2019, Knut and Alice Wallenbergs Foundation, Visiting Professor at Uppsala University.**, \$75,000
- 2018 **BOLD (Broadening Opportunity through Leadership and Diversity) Faculty Fellow, For: Improving Inclusive Excellence in Computational Science & Engineering** \$10,000
- 2018 **IMPART, Implementation of Multicultural Perspectives and Approaches in Research and Teaching Award, For: STEMInist Seminar: Fostering Community and Awareness in STEM,** \$3,980
- 2006 **Hans-Werthen Prize 2006.**, *This is a prize for doing a postdoc outside Sweden* ~ \$20,000
- 2001 & 2004 **Generaldirektör Waldemar Borgeman prize**
- 2002 & 2005 **Erik Petersohns minnesfond prize**
- 2004 & 2005 **Stiftelsen Lars Hiertas minne prize, The three above prizes (six awards) tallied \$20000 and supported extended research visits (3-6 months), trips to conferences and salary**

Research Funding

Current

- \$480,000 Machine-learning-assisted practical quantum error correction via optimal control, Co-PI Appelö, (total award \$4,000,000), QC3 BAA W911NF25S0002 (Army Research Office), 01/07/26-30/06/30
- \$300,000 Quantum Digital Twins. PI Daniel Appelö, DOE-EXPRESS (total award \$500,000), 09/16/2024 - 09/15/2026.
- \$299,148 Collaborative Research: MATH-DT: Mathematical Foundations of Quantum Digital Twins, Co-PI Daniel Appelö, NSF, (total award \$599,138), 01/15/2025 - 01/14/2028.
- \$283,456 High Order Wave Equation Algorithms for Frequency Domain Problems. PI Daniel Appelö, NSF (DMS 2208164), 09/15/2022 - 09/15/2026.

Pending

- \$49,958 Conference: 17th International Conference on Mathematical and Numerical Aspects of Wave Propagation, Co-PI Daniel Appelö, NSF, (total award \$49,958), 01/05/2026 - 01/09/2026.

Past

- \$2,965,563 NRT-AI-HDR: Harnessing the data revolution (HDR) to enable predictive multi-scale modeling across STEM. PI Daniel Appelö, NSF 2152014, 07/01/22-06/30/27
- \$303,373 Numerical Methods for Wave Equations in Time and Frequency Domain. PI Daniel Appelö, NSF (DMS 1913076 & 2210286 (transfer to MSU)), 06/15/2019 - 05/31/2023.
- \$250,000 DOE: Tough Errors Are no Match (TEAM): Optimizing the quantum compiler for noise resilience, 10/01/2019 - 01/31/2024. \$250,000 CU-PI Appelö. This is part of a larger DOE Accelerated Research in Quantum Computing (ARQC) 5-year multi institution program (\$9,000,000 total Lead PI: B. David Clader / Greg Quiroz, JHU.)
- \$15,000 STINT Initiation Grant: Computational Methods for Wave Propagation, PI Olof Runborg (KTH, Sweden) Co-PI Appelö.
- \$61,000 Uppsala University Visiting Professor fund for the summers 2017 & 2018
- \$6,000 Fast wave equation solvers for shallow and range dependent underwater acoustics: Inverse problems and uncertainty quantification, Imaging Science IRT seed grant 2019.
- \$20,000 Differential imaging of evolution in highly scattering composites with unknown micro/macrostructure, Imaging Science IRT seed grant 2019. PI Fatemeh Pourahmadian, Co-PI Appelö
- \$258,196 Hybrid Hermite-Discontinuous Galerkin Methods with Applications to Elastic and Electromagnetic Waves. PI Daniel Appelö, NSF (DMS-1319054), 09/15/2013 - 08/31/2017, \$258,196 (\$179,963 direct, \$78,233 indirect)

\$40,369 **ARRA** Caltech Subaward: CR: Simulation and analysis of Jet Noise. PI Daniel Appelö, NSF / Caltech, 06/01/2012 - 05/31/2014, \$40,369 (\$26,734 direct, \$13,635 indirect)

Publications

Submitted Articles

- [S1] Spencer Lee and Daniel Appelö. Filon methods for highly oscillatory controlled quantum systems. (*SUBMITTED*) *SIAM Journal on Scientific Computing*, 2026. Submitted to the Special Section on “Quantum Computing: Numerical Algorithms and Applications”.
- [S2] Jiuhua Hu, Daniel Appelö, and Yingda Cheng. Gregory nested picard iteration schemes for open quantum systems governed by the Lindblad equation. *arXiv:2606.29002*, 2026.
- [S3] Daniel Appelö, William D. Henshaw, and Zhichao Peng. Numerical study of eigenvector deflation to accelerate the WaveHoltz method. *arXiv:2606.31842*, 2026.
- [S4] Amit Rotem, Olof Runborg, and Daniel Appelö. The WaveHoltz heterogeneous multiscale method. *arXiv:2607.05811*, 2026.
- [S5] Peter DelMastro, Daniel Appelö, and Yingda Cheng. Completely Positive and Trace Preserving Schemes with Tensor Train Compression for the Lindblad Equation. *arXiv:2605.01494*, 2026.
- [S6] Jiuhua Hu, Daniel Appelö, and Yingda Cheng. Arbitrary high order low-rank completely positive and trace preserving (CPTP) schemes for Lindblad equations with time-dependent Hamiltonian. *ArXiv:2511.12012*, 2025.
- [S7] Daniel Appelö and Yingda Cheng. A new cross approximation for Tucker tensors and its application in Tucker-Anderson acceleration. *Submitted (arXiv:2509.18554)*, 2025.
- [S8] Daniel Appelö, Francis Appiah, Jeffrey W. Banks, Cassandra Carrick, William D. Henshaw, and Donald W. Schwendeman. A multi-frequency Helmholtz solver based on the WaveHoltz algorithm. *Submitted (arXiv:2507.23613)*, 2025.
- [S9] Yann-Meing Law, Zhichao Peng, Daniel Appelö, and Thomas Hagstrom. A P -adaptive hermite method for nonlinear dispersive Maxwell’s equations. *arXiv 2504.09269*, 2025.

Accepted Articles

- [A10] Daniel Appelö and Yingda Cheng. lrAA: Low-Rank Anderson Acceleration. *SISC (accepted)*, 2026.

Articles in Archival Journals

- [J11] Amit Rotem, Olof Runborg, and Daniel Appelö. Convergence of the semi-discrete WaveHoltz iteration. *Journal of Computational Physics*, 558:114882, 2026.
- [J12] Andreas Granath, Daniel Appelö, and Siyang Wang. LR-WaveHoltz: A low-rank Helmholtz solver. *Journal of Computational Physics*, page 115175, 2026.
- [J13] Daniel Appelö, Jeffrey W. Banks, William D. Henshaw, Ngan Le, and Donald W. Schwendeman. EigenWave: An optimal $O(N)$ method for computing eigenvalues and eigenvectors by time-filtering the wave equation. *Journal of Computational Physics*, page 114758, 2026.
- [J14] Daniel Appelö, Jeffrey W. Banks, William D. Henshaw, and Donald W. Schwendeman. An $O(N)$ Helmholtz solver using WaveHoltz and overset grids. *SIAM Journal of Scientific Computing*, 48(3):A1367–A1398, 2026.
- [J15] Daniel Appelö, Jeffrey W. Banks, William D. Henshaw, and Donald W. Schwendeman. A rule of thumb for choosing points-per-wavelength for finite difference approximations of Helmholtz problems. *Journal of Computational Physics*, page 114703, 2026.

- [J16] Spencer Lee and Daniel Appelö. High-order Hermite optimization: Fast and exact gradient computation in open-loop quantum optimal control using a discrete adjoint approach. *Journal of Computational Physics*, 552:114697, 2026.
- [J17] Ke Chen, Daniel Appelö, Tracy Babb, and Per-Gunnar Martinsson. Fast and high-order approximation of parabolic equations using hierarchical direct solvers and implicit Runge-Kutta methods. *Communications on Applied Mathematics and Computation*, 8(1):248–268, 2026.
- [J18] Shixu Meng, Daniel Appelö, and Yingda Cheng. Preconditioning low rank generalized minimal residual method (GMRES) for implicit discretizations of matrix differential equations. *SIAM Journal on Matrix Analysis and Applications*, 46(4):2475–2500, 2025.
- [J19] Daniel Appelö and Yingda Cheng. Kraus is King: High-order completely positive and trace preserving (CPTP) low rank method for the Lindblad master equation. *Journal of Computational Physics*, 534:114036, 2025.
- [J20] Yann-Meing Law, Daniel Appelö, and Thomas Hagstrom. The Hermite-Taylor correction function method for embedded boundary and Maxwell’s interface problems. *Journal of Computational Physics*, 537(3):114111, 2025.
- [J21] Daniel Appelö, Thomas Hagstrom, and Yann-Meing Law-Kam-Cio. Energy-conserving Hermite methods for Maxwell’s equations. *Communications on Applied Mathematics and Computation*, 7:1146–1173, 2025.
- [J22] Daniel Appelö and Yingda Cheng. Robust implicit adaptive low rank time-stepping methods for matrix differential equations. *Journal of Scientific Computing*, 102(3):81, 2025.
- [J23] Allen Alvarez Loya, Daniel Appelö, and William D. Henshaw. High order accurate Hermite schemes on curvilinear grids with compatibility boundary conditions. *Journal of Computational Physics*, 522:113597, 2025.
- [J24] Y-M. Law and D. Appelö. The Hermite-Taylor correction function method for Maxwell’s equations. *Communications on Applied Mathematics and Computation*, 2023.
- [J25] Zhichao Peng, Daniel Appelö, and Shuang Liu. Universal AMG accelerated embedded boundary method without small cell stiffness. *Journal of Scientific Computing*, 97(2):40, 2023.
- [J26] LA Martinez, Z Peng, D Appelö, DM Tennant, N Anders Petersson, JL DuBois, and YJ Rosen. Noise-specific beating in the higher-level ramsey curves of a transmon qubit. *Applied Physics Letters*, 122(11):114002, 2023.
- [J27] Daniel Appelö, Lu Zhang, Thomas Hagstrom, and Fengyan Li. An energy-based discontinuous galerkin method with tame cfl numbers for the wave equation. *BIT Numerical Mathematics*, 63(1):5, 2023.
- [J28] Daniel Appelö, Kiera van der Sande, and Nathan Albin. Fourier continuation discontinuous Galerkin methods for linear hyperbolic problems. *Communications on Applied Mathematics and Computation*, 5:1385–1405, 2023.
- [J29] D. Appelö, F. Garcia, A. Alvarez Loya, and O. Runborg. El-WaveHoltz: A time-domain iterative solver for time-harmonic elastic waves. *Computer Methods in Applied Mechanics and Engineering*, 401:115603, 2022.
- [J30] Zhichao Peng and Daniel Appelö. EM-WaveHoltz: A flexible frequency-domain method built from time-domain solvers. *IEEE Transactions on Antennas and Propagation*, 70(7):5659–5671, 2022.
- [J31] Siyang Wang, Daniel Appelö, and Gunilla Kreiss. An energy-based summation-by-parts finite difference method for the wave equation in second order form. *Journal of Scientific Computing*, 91(2):1–22, 2022.

- [J32] Yunan Yang, Alex Townsend, and Daniel Appelö. Anderson acceleration based on the H_s sobolev norm for contractive and noncontractive fixed-point operators. *Journal of Computational and Applied Mathematics*, 403:113844, 2022.
- [J33] Hao Li, Daniel Appelö, and Xiangxiong Zhang. Accuracy of spectral element method for wave, parabolic, and Schrödinger equations. *SIAM Journal on Numerical Analysis*, 60(1):339–363, 2022.
- [J34] Allen Alvarez Loya and Daniel Appelö. A Hermite method with a discontinuity sensor for Hamilton–Jacobi equations. *Journal of Scientific Computing*, 90(3):1–31, 2022.
- [J35] Lu Zhang, Daniel Appelö, and Thomas Hagstrom. Energy-based discontinuous Galerkin difference methods for second-order wave equations. *Communications on Applied Mathematics and Computation*, pages 1–25, 2021.
- [J36] D. Appelö, F. Garcia, and O. Runborg. WaveHoltz: Iterative solution of the Helmholtz equation via the wave equation. *SIAM Journal on Scientific Computing*, 42(4):A1950–A1983, 2020.
- [J37] Daniel Appelö, Thomas Hagstrom, Qi Wang, and Lu Zhang. An energy-based discontinuous Galerkin method for semilinear wave equations. *Journal of Comput. Phys.*, 418:109608, 2020.
- [J38] Oleksii Beznosov and Daniel Appelö. Hermite - discontinuous Galerkin overset grid methods for the scalar wave equation. *Communications on Applied Mathematics and Computation*, 2020.
- [J39] Klaus Heinemann, Daniel Appelö, Desmond P. Barber, Oleksii Beznosov, and James A. Ellison. Reevaluation of spin-orbit dynamics of polarized e^-e^+ beams in high energy circular accelerators and storage rings: An approach based on a bloch equation. *International Journal of Modern Physics A*, 35(15n16):2041003, 2020.
- [J40] Klaus Heinemann, Daniel Appelö, Desmond P. Barber, Oleksii Beznosov, and James A. Ellison. The Bloch equation for spin dynamics in electron storage rings: computational and theoretical aspects. *International Journal of Modern Physics A*, 34(36):1942032, 2019.
- [J41] D. Appelö, V. A. Bokil, Y. Cheng, and F. Li. Energy stable SBP-FDTD methods for Maxwell–Duffing models in nonlinear photonics. *IEEE Journal on Multiscale and Multiphysics Computational Techniques*, 4:329–336, 2019.
- [J42] M. Motamed and D. Appelö. Wasserstein metric-driven bayesian inversion with application to wave propagation problems. *International Journal for Uncertainty Quantification*, 9(4):395–414, 2019.
- [J43] Lu Zhang, Thomas Hagstrom, and Daniel Appelö. An energy-based discontinuous Galerkin method for the wave equation with advection. *SIAM Journal of Numerical Analysis*, 57(5):2469–2492, 2019.
- [J44] D. Appelö and S. Wang. An energy-based discontinuous Galerkin method for coupled elasto-acoustic wave equations in second-order form. *International Journal for Numerical Methods in Engineering*, 119(7):618–638, 2019.
- [J45] D. Appelö, T. Hagstrom, and A. Vargas. Hermite methods for the scalar wave equation. *SIAM Journal on Scientific Computing*, 40(6):A3902–A3927, 2018.
- [J46] A. Kornelus and D. Appelö. Flux-conservative Hermite methods for simulation of nonlinear conservation laws with shocks. *J. of Sci. Comput.*, 76:24–47, 2018.
- [J47] M. Motamed and D. Appelö. A MultiOrder discontinuous Galerkin Monte Carlo method for hyperbolic problems with stochastic parameters. *SIAM J. on Numer. Anal.*, 56(1):448–468, 2018.
- [J48] D. Appelö and T. Hagstrom. An energy-based discontinuous Galerkin discretization of the elastic wave equation in second order form. *Comput. Meth. Appl. Mech. Engrg.*, 338:362–391, 2018.

- [J49] D. Appelö, G. Kreiss, and S. Wang. An explicit Hermite-Taylor method for the Schrödinger equation. *Communications in Computational Physics*, 21(5):1207–1230, 2017.
- [J50] D. Appelö and T. Hagstrom. A new discontinuous Galerkin formulation for wave equations in second order form. *SIAM Journal On Numerical Analysis*, 53(6):2705–2726, 2015.
- [J51] X. Chen, D. Appelö, and T. Hagstrom. A hybrid Hermite–discontinuous Galerkin method for hyperbolic systems with application to Maxwell’s equations. *Journal of Computational Physics*, 257, Part A:501–520, 2014.
- [J52] D. Appelö and N. A. Petersson. A fourth-order embedded boundary method for the wave equation. *SIAM Journal on Scientific Computing*, 34(6):2982–3008, 2012.
- [J53] D. Appelö, J. W. Banks, W. D. Henshaw, and D. W. Schwendeman. Numerical methods for solid mechanics on overlapping grids: Linear elasticity. *Journal of Computational Physics*, 231(18):6012–6050, 2012.
- [J54] T. Hagstrom, D. Appelo, T. Colonius, M. Inkman, and C. Y. Jang. Simulation of compressible flows using Hermite methods. *The Journal of the Acoustical Society of America*, 131(4):3429–3429, 2012.
- [J55] D. Appelö and T. Hagstrom. On advection by Hermite methods. *Pacific Journal Of Applied Mathematics*, 4(2):125–139, 2011.
- [J56] C.L. Ting, D. Appelö, and Z.G. Wang. Minimum energy path to membrane pore formation and rupture. *Physical Review Letters*, 106(16):168101, 2011.
- [J57] A. Samanta, D. Appelö, T. Colonius, J. Nott, and J. Hall. Computational modeling and experiments of natural convection for a titan montgolfiere. *AIAA Journal*, 5:1007–1016, 2010.
- [J58] D. Appelö and T. Colonius. A high-order super-grid-scale absorbing layer and its application to linear hyperbolic systems. *Journal of Computational Physics*, 228(11):4200–4217, 2009.
- [J59] D. Appelö and N. A. Petersson. A stable finite difference method for the elastic wave equation on complex geometries with free surfaces. *Communications in Computational Physics*, 5(1):84–107, 2009.
- [J60] D. Appelö and T. Hagstrom. A general perfectly matched layer model for hyperbolic-parabolic systems. *SIAM Journal on Scientific Computing*, 31(5):3301–3323, 2009.
- [J61] V. Eliasson, W. D. Henshaw, and D. Appelö. On cylindrically converging shock waves shaped by obstacles. *Physica D: Nonlinear Phenomena*, 237(14-17):2203–2209, 2008.
- [J62] D. Appelö and G. Kreiss. Application of a perfectly matched layer to the nonlinear wave equation. *Wave Motion*, 44(7-8):531–548, 2007.
- [J63] T. Hagstrom and D. Appelö. Automatic Symmetrization and Energy Estimates Using Local Operators for Partial Differential Equations. *Communications in Partial Differential Equations*, 32(7):1129–1145, 2007.
- [J64] D. Appelö, T. Hagstrom, and G. Kreiss. Perfectly matched layers for hyperbolic systems: General formulation, well-posedness, and stability. *SIAM Journal on Applied Mathematics*, 67(1):1–23, 2006.
- [J65] D. Appelö and G. Kreiss. A new absorbing layer for elastic waves. *Journal of Computational Physics*, 215(2):642–660, 2006.

[Proceedings](#)

- [P66] Tracy Babb, Per Gunnar Martinsson, and Daniel Appelö. HPS accelerated spectral solvers for time dependent problems: Part 1, algorithms. In *Proceedings of: Spectral and High Order Methods for Partial Differential Equations ICOSAHOM 2018*.
- [P67] Tracy Babb, Per Gunnar Martinsson, and Daniel Appelö. HPS accelerated spectral solvers for time dependent problems: Part 2, numerical experiments. In *Proceedings of: Spectral and High Order Methods for Partial Differential Equations ICOSAHOM 2018*.
- [P68] Daniel Appelö, Fortino Garcia, and Olof Runborg. *WaveHoltz: Parallel and scalable solution of the Helmholtz equation*, pages 1541–1545. 2019.
- [P69] D. Appelö, V. Bokil, Y. Cheng, and F. Li. Energy stable staggered high order finite differences for optical media. In *2019 International Applied Computational Electromagnetics Society Symposium (ACES)*, pages 1–2, April 2019.
- [P70] A Klaus, Oleksii Beznosov, James A Ellison, Desmond P. Barber, and Daniel Appelö. A pseudospectral method for solving the bloch equations of the polarization density in e- storage rings. In *9th International Particle Accelerator Conference, IPAC2018, Vancouver, BC, Canada*, 2018.
- [P71] Adeline Kornelus and Daniel Appelö. On the scaling of entropy viscosity in high order methods. In *Springer Lecture Notes in Computational Science and Engineering: Spectral and High Order Methods for Partial Differential Equations ICOSAHOM 2016: Selected Papers from the ICOSAHOM conference, June 27-July 1, 2016, Rio de Janeiro, Brazil*, pages 175–187. Springer, 2017.
- [P72] D. Appelö and S. Wang. An energy based discontinuous Galerkin method for acoustic-elastic waves. Extended abstract Waves 2017.
- [P73] D. Appelö, T. Hagstrom, and A. Semenova. An energy based discontinuous Galerkin method for hamiltonian systems. Extended abstract Waves 2017.
- [P74] D. Appelö, T. Hagstrom, and A. Kornelus. Sobolev-dG a class of dG methods with tame CFL numbers. Extended abstract Waves 2017.
- [P75] D. Appelö and T. Hagstrom. A new discontinuous Galerkin formulation for wave equations in second order form. Extended abstract Waves 2015, 2015.
- [P76] A. Kornelus and D. Appelö. Application of the entropy viscosity method to Hermite methods for shock problems. Extended abstract Waves 2015, 2015.
- [P77] T. Colonius, A. Sinha, D. Rodríguez, A. Towne, J. Liu, G.A. Brès, D. Appelö, and T. Hagstrom. Simulation and modeling of turbulent jet noise. In Jochen Fröhlich, Hans Kuerten, Bernard J. Geurts, and Vincenzo Armenio, editors, *Direct and Large-Eddy Simulation IX*, ERCOFTAC Series, pages 305–310. Springer International Publishing, 2015.
- [P78] Thomas Hagstrom and Daniel Appelö. Solving PDEs with Hermite interpolation. In *Springer Lecture Notes in Computational Science and Engineering: Spectral and High Order Methods for Partial Differential Equations ICOSAHOM 2014: Selected papers from the ICOSAHOM conference, June 23-27, 2014, Salt Lake City, Utah, USA*, pages 31–49. Springer, 2015.
- [P79] C. Y. Jang, D. Appelö, T. Colonius, T. Hagstrom, and M. Inkman. An analysis of dispersion and dissipation properties of Hermite methods and its application to direct numerical simulation of jet noise. In *18th AIAA/CEAS Aeroacoustics Conference (33rd AIAA Aeroacoustics Conference)*. American Institute of Aeronautics and Astronautics, 2013/10/31 2012.
- [P80] T. Hagstrom, D. Appelö, and C. Y. Jang. Hermite methods for hyperbolic-parabolic systems. In *Waves2011, Vancouver, Canada*, 2011.

- [P81] D. Appelö, M. Inkman, T. Hagstrom, and T. Colonius. Hermite methods for aeroacoustics: Recent progress. In *17th AIAA/CEAS Aeroacoustics Conference (32nd AIAA Aeroacoustics Conference)*, Portland, Oregon, June 5-8, 2011, number AIAA-2011-2757, 2011.
- [P82] D. Appelö, T. Colonius, T. Hagstrom, and M. Inkman. Development of arbitrary-order Hermite methods for simulation and analysis of turbulent jet noise. *Procedia Engineering: IUTAM Symposium on Computational Aero-Acoustics for Aircraft Noise Prediction*, University of Southampton, 29-31 March, 2010.
- [P83] T. Colonius, D. Appelö, J. Nott, and J. Hall. Computational modeling and experiments of natural convection for a Titan Montgolfiere. In *AIAA Balloon Systems Conference, AIAA-2009-2806*, Seattle 2009, 2009.
- [P84] T. Hagstrom and D. Appelö. Experiments with Hermite methods for simulating compressible flows: Runge-Kutta time-stepping and absorbing layers. In *13th AIAA/CEAS Aeroacoustics Conference*, number 2007-3505, 2007.
- [P85] D. Appelö, S. Nilsson, A. N. Petersson, and B. Sjögreen. A stable finite difference method for the elastic wave equation on complex domains with free surface boundary conditions. In *Proceedings of Waves 2007, Reading, UK July 23-27*, 2007.
- [P86] D. Appelö and G. Kreiss. A new PML for the simulation of elastic waves in anisotropic media. In *The 7th Int. Conf. on Math. and Num. Aspects of Wave Propagation, Brown University, USA, June 20-24*, 2005.
- [P87] D. Appelö and T. Hagstrom. Construction of stable PMLs for general 2×2 symmetric hyperbolic systems. In *Proceedings of the Tenth International Conference on Hyperbolic Problems: Theory, Numerics, Applications, Osaka*, 2004.
- [P88] D. Appelö and G. Kreiss. Discretely nonreflecting boundary conditions for higher order centered schemes for wave equations. In Cohen et. al, editor, *Mathematical and Numerical Aspects of Wave Propagation, Proceedings Waves2003*, pages 130–125. Springer Verlag, 2003.
- [P89] D. Appelö and G. Kreiss. Evaluation of a well-posed perfectly matched layer for computational acoustics. In T.Y. Hou E. Tadmor, editor, *Hyperbolic Problems: Theory, Numerics, Applications, Proceedings of the Ninth International Conference on Hyperbolic Problems*, pages 285–294. Springer Verlag, 2002.
- Unpublished
- [U90] Zhichao Peng, Daniel Appelö, Nils Anders Petersson, Mohamamd Motamed, Fortino Garcia, and Yujin Cho. Deterministic and Bayesian characterization of quantum computing devices. *arXiv:2306.13747*, 2024.
- Thesis
- [T91] D. Appelö. *Absorbing Layers and Non-Reflecting Boundary Conditions for Wave Propagation Problems*. PhD thesis, Royal Institute of Technology, October 2005.
- [T92] D. Appelö. Non-reflecting boundary conditions for wave propagation problems. Licenciates Thesis, Royal Institute of Technology, 2003.
- [T93] D. Appelö. PML-methods for the linearized Euler equations. Master’s thesis, Royal Institute of Technology, 2000.

Plenary Presentations

- What’s new with the wave equation?, The North American High Order Methods Conference (NAHOMCon) San Diego June 2-5 2019

- How Dark Is the Unilluminable Room?, University of Toronto Institute for Aerospace Studies - Computational Science and Engineering Symposium, Toronto, May 2023

Presentations at Professional Meetings

- What's new with the WaveHoltz iteration?, FoCM 2026, workshop on Foundations of Numerical PDEs, July 11 2026, Vienna Austria.
- Low-Rank Anderson Acceleration for Nonlinear Matrix and Tensor Equations, SciCADE 2026, minisymposium on Dynamical Low-Rank Approximation: Advances in Theory and Application, June 29 - July 3 2026, Edinburgh UK.
- Accelerating WaveHoltz with Deflation, Waves 2026, June 23 2026, Montreal Canada.
- A numerical methodist's adventure in the land of quantum computing, SLMath workshop: Kinetic Theory: Novel Statistical, Stochastic and Analytical Methods, October 24 2025, Berkeley CA
- Kraus is King: High-order Completely Positive and Trace Preserving (CPTP) Low Rank Method for the Lindblad Master Equation, SIAM Annual meeting, August 2025, Montreal Canada.
- lrAA Low Rank Anderson Acceleration, Numerical analysis - a workshop in honor of Gunilla Kreiss, June 2025 Uppsala University, Sweden.
- Anderson is Alright and Kraus is King, MURI Virtual Workshop on Tensor Networks for High Dimensional PDEs, May 2025 (virtual).
- Quantum Digital Twins, NSF Comp Math Meeting May 2025, Salt Lake City UT.
- Quantum Digital Twins (poster presentation), DOE ASCR PI Meeting March 2025, Frisco TX.
- Low rank methods for linear and nonlinear PDE, SIAM CSE 2025 March 2025, Fort Worth TX.
- Kraus is King, TC60 December 2024, Pasadena, USA.
- Kraus is King: High-order Completely Positive and Trace Preserving (CPTP) Low Rank Method for the Lindblad Master Equation, IEEE Quantum Week 2024, September 2024, Montreal Canada.
- How Dark is the Unilluminable Room?, Waves2024 June 2024, Berlin, Germany.
- Quantum Digital Twins - a numerical methodist's adventure in the land of quantum computers, ICERM Workshop on Numerical Analysis of Multiphysics Problems, Feb 12-18 2024, Providence RI
- How Dark is the Unilluminable Room?, SIAM CSE 2023 March 2023, Amsterdam, Netherlands.
- EM-WaveHoltz: A time-domain frequency-domain solver for Maxwell's equations, Waves 2022 July 2022, Palaiseau, France.
- WaveHoltz-DG: A Wave Equation Based Solver for the Helmholtz Equation, SIAM CSE March 2021, Virtual.
- WaveHoltz: Parallel and Scalable Solution of the Helmholtz Equation via Wave Equation Iteration, SCICADE July 2019, Innsbruck Austria.
- Parallel frequency domain electromagnetic solvers without agonizing pain, ICIAM 2019, Valencia Spain.
- * Wasserstein Metric-Driven Deterministic and Bayesian Inversion for Elastic Wave Propagation, ICIAM 2019, July 2019, Valencia Spain.
- Energy Stable Staggered High Order Finite Differences for Optical Media, 2019 International Applied Computational Electromagnetics Society Symposium (ACES), Miami, FL
- Wasserstein Metric-driven Bayesian Inversion with Applications to Wave Propagation Problems, SIAM Conference on Mathematical & Computational Issues in the Geosciences (GS19), Houston, TX, 2019
- * Numerical Homogenization for Waves using Hermite Methods, SIAM CSE Spokane 2019
- Hermite and dG methods for wave equations and their application to uncertain and inverse problems, WCCM, 2018, New York, USA, July 2018

- * Hermite and dG methods for wave equations and their application to uncertain and inverse problems, ICOSAHOM, 2018, London UK, July 2018
- o Energy based discontinuous Galerkin methods for complex materials, ICERM Workshop on Computational Aspects of Time Dependent Electromagnetic Wave Problems in Complex Materials, Providence, USA, June 2018
- o Globally Super-Convergent Conservative Hermite Methods for the Scalar Wave Equation. Banff workshop 17w5152 - Connections in Geometric Numerical Integration and Structure-Preserving Discretization, Banff, Canada, June 2017
- o Three Tricks to Tame the CFL in Discontinuous Galerkin Methods. SIAM CSE, Atlanta, USA, March 2017
- o An Energy Based Discontinuous Galerkin Method for Hamiltonian Systems. The Tenth IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory, Athens GA, USA, April 2017
- * An Energy Based Discontinuous Galerkin Method for Hamiltonian Systems. Waves 2017, Minnesota, USA, May 2017
- o Energy Based Discontinuous Galerkin Methods for Nonlinear Waves. SIAM NLWCS, Philadelphia, USA, August 2016
- o Energy Based Discontinuous Galerkin Methods for Propagation of Waves in Deterministic and Stochastic Problems, ICOSAHOM, 2016, Rio de Janeiro Brazil, 2016
- o An energy-based discontinuous Galerkin discretization of the elastic wave equation in second order form, ECCOMAS Congress 2016, Crete, Greece, June 2016
- o A Multi-Order Monte Carlo Discontinuous Galerkin Method for Wave Equations with Uncertainty. SIAM UQ 2016, EPFL, Switzerland, April 2016
- * A new discontinuous Galerkin formulation for wave equations in second order form. Waves 2015, Karlsruhe, Germany, July 2015
- * Upwind DG for Acoustic and Elastic Wave Equations, SIAM CSE, Salt Lake City, March 2015
- o A Fourth Order Accurate Embedded Boundary Method for the Wave Equation in Second Order Form, SIAM CSE, Salt Lake City, March 2015
- o Discontinuous Galerkin methods for Nonlinear Variational Wave Equations, AMS Western Spring Sectional Meeting, Albuquerque, NM, April 4-6, 2014
- * Dissipative and Non-dissipative Hermite Methods for the Wave Equation, ICOSAHOM-2014 Salt Lake City, June 23-27 2014.
- o Upwind DG for the wave equation in second order form, 11th International Conference on Theoretical and Computational Acoustics 10-14 March, 2014, Texas A&M University, College Station.
- o P-adaptive Hermite methods for the Schrödinger equation. Eighth IMACS international conference on nonlinear evolution equations and wave phenomena: computation and theory Athens, GA, March 25, 2013.
- * Hermite Methods for Hyperbolic Systems: Applications and Extensions. SIAM CS&E, Boston, February 26, 2013.
- o Jet Noise DNS using Arbitrary-order Hermite Methods. SIAM CS&E, Boston, February 26, 2013.
- o SIAM Annual meeting, Minneapolis, Minnesota, July 9-13, 2012. Invited mini symposium on modeling of rare events.
- o Nucleation Events in Soft Condensed Matter Using the String Method, SIAM Annual meeting, Minneapolis, Minnesota, July 9-13, 2012, mini symposium on modeling of rare events.
- * Hybrid Hermite-Discontinuous-Galerkin Methods for Hyperbolic Systems, SIAM CSE 2011.
- o The Minimum Energy Path to Membrane Pore Formation and Rupture, SIAM CSE 2011.
- o Hermite Methods for Aeroacoustics: Recent Progress, 6 - 8 Jun 2011, 17th AIAA/CEAS Aeroacoustics Conference, Portland OR.

- Development of Arbitrary-Order Hermite Methods for Simulation and Analysis of Turbulent Jet Noise, IUTAM Symposium on Computational Aero-Acoustics for Aircraft Noise Prediction, University of Southampton, 29-31 March 2010.
- * Super-Grid-Scale Models as Absorbing Layers for the Navier-Stokes Equations and Other Applications, SIAM Annual Meeting, San Diego, 2008.
- A General Perfectly Matched Layer Model for Hyperbolic Parabolic Systems, SIAM Annual Meeting, San Diego, 2008.
- Studies of Compressible Flows Using Arbitrary-order Hermite Discretizations, SIAM Annual Meeting, San Diego, 2008.
- * A Stable Finite Difference Scheme for the Elastic Wave Equation on Complex Domains with Free Surface Boundary Conditions, 8th Int. Conf. on Math. and Numerical Aspects of Waves (Waves 2007), Reading, UK, 2007.
- * Simulation of elastic waves in cylindrical shells, CAR Research and Technology Showcase, LLNL, 2007.
- * A Stable Finite Difference Scheme for the Elastic Wave Equation on Complex Domains with Free Surface Boundary Conditions, ASCR Applied Mathematics Research PI Meeting, LLNL, May 22-24, 2006.
- * A New PML for the simulation of elastic waves in anisotropic media, The 7th Int. Conf. on Math. and Num. Aspects of Wave Propagation, Brown University, USA, June 20-24, 2005.
- * Energy Estimates for Perfectly Matched Layers, Tenth International Conference on Hyperbolic Problems, Theory, Numerics, Applications, Osaka, Japan, September 13-17, 2004.
- * Discretely Nonreflecting Boundary Conditions for Higher order Centered Schemes for Wave Equations, The Sixth Int. Conf. on Math. and Num. Aspects of Wave Propagation, 2003, Jyväskylä University, Finland.
- * Evaluation of a well-posed Perfectly Matched Layer for Computational Acoustics, Ninth Int. Conf. on Hyperbolic Problems Theory, Numerics, Applications, 2002, Caltech, Pasadena, CA, USA.

Colloquium and Departmental Seminars

- Structure-Preserving Algorithms for Quantum Digital Twins: A Numerical Analyst's Journey, Department of Mathematics University of Tennessee, Knoxville, Colloquium, April 15 2026.
- Structure-Preserving Algorithms for Quantum Digital Twins: A Numerical Analyst's Journey, Department of Mathematics Simon Fraser University, Canada, Applied Mathematics Seminar, February 17 2026.
- Arbitrary High Order Low-rank Completely Positive and Trace Preserving (CPTP) Schemes for Lindblad Equations with Time-dependent Hamiltonian, Department of Mathematics University of Strathclyde, Numerical Analysis seminar (online), January 27 2026.
- Kraus is King: High-order Completely Positive and Trace Preserving (CPTP) Low Rank Method for the Lindblad Master Equation, Applied Math Colloquium, Department of Mathematics UC Merced and PIMS CRG seminar (online), November 6 2025.
- Kraus is King: High-order Completely Positive and Trace Preserving (CPTP) Low Rank Method for the Lindblad Master Equation, Livermore Center for Quantum Science Seminar, LLNL Livermore Ca, November 5 2025.
- Sub-linear methods for discretizing partial differential equations using data science techniques, CADES Colloquia Salientia, Portland State University, October 10 2025
- Low rank Anderson Acceleration, Computational and Applied Mathematics (CAM) Seminar at NC State University, April 17 2025
- Low rank Anderson Acceleration, Applied Math & Analysis Seminar, Duke University, April 15 2025

- Low rank Anderson Acceleration, Mathematics Colloquium, Southern Methodist University, Dallas TX, March 27 2025
- Quantum Digital Twins - a numerical methodist's adventure in the land of quantum computers, TDB Seminar Uppsala University, Uppsala Sweden, June 12 2024
- Numerical methods for modeling quantum computers, ARQC Seminar, Johns Hopkins APL, May 1 2024
- WaveHoltz: Parallel and Scalable Solution of the Helmholtz Equation via Wave Equation Iteration, Scientific Computing Seminar, Applied Math. Brown University, February 2024
- How Dark is the Unillumnable Room?, Caltech Mechanical Engineering Seminar, October 2023
- How Dark is the Unillumnable Room?, Cal State Long Beach Colloquium, October 2023
- What's new with the Wave Equation?, Virginia Tech., February 2023
- WaveHoltz: How the wave equation can be used to solve Helmholtz equation, Arizona State University, January 2023
- WaveHoltz: How the wave equation can be used to solve Helmholtz equation, Virginia Tech., October 2022
- WaveHoltz: How the wave equation can be used to solve Helmholtz equation, Uppsala University, June 2022
- WaveHoltz-DG: A Wave Equation Based Solver for the Helmholtz Equation, Michigan Tech. University April 2022
- WaveHoltz-DG: A Wave Equation Based Solver for the Helmholtz Equation, UC Merced Waves seminar March 2022
- WaveHoltz: Parallel and Scalable Solution of the Helmholtz Equation via Wave Equation Iteration, Comp. Math. Seminar Umeå University, July 2022
- WaveHoltz: Parallel and Scalable Solution of the Helmholtz Equation via Wave Equation Iteration, NA & PDE seminar University of Delaware, Feb 2021
- WaveHoltz: Parallel and Scalable Solution of the Helmholtz Equation via Wave Equation Iteration, Computational Mathematics Seminar, Mathematical Sciences Institute, The Australian National University, Feb 2021
- WaveHoltz: Parallel and Scalable Solution of the Helmholtz Equation via Wave Equation Iteration, Mathematical Sciences Colloquium, RPI , Feb 2020
- WaveHoltz: Parallel and Scalable Solution of the Helmholtz Equation via Wave Equation Iteration, CMSE Colloquium MSU October 2019
- WaveHoltz: Parallel and Scalable Solution of the Helmholtz Equation via Wave Equation Iteration, ACMS Applied Math Seminar University of Notre Dame October 2019
- WaveHoltz: Parallel and Scalable Solution of the Helmholtz Equation via Wave Equation Iteration, Computational and Applied Math Seminar, Chalmers, Sweden, May 2019
- What's new with the wave equation?, Colloquium Oregon State University, April 2019
- What is new with the wave equation? Analysis and Applications Seminar University of Colorado Colorado Springs February 2019
- What is new with the wave equation?, Seminar in Numerical Analysis, June 2018, Royal Institute of Technology, Stockholm
- What is new with the wave equation?, Computational and Applied Math Seminar, June 2018, Chalmers Institute of Technology
- What is new with the wave equation?, Applied Math. Colloquium, March, 2018, Colorado School of Mines
- What is new with the wave equation?, Computational and Applied Math. Seminar, March, 2018, Arizona State University
- Energy Based Discontinuous Galerkin Methods, Workshop Seminar, July, 2017, Central China Normal University, Wuhan, China

- Globally Super-Convergent Conservative Hermite Methods for the Scalar Wave Equation, Workshop Seminar, July, 2017, Central China Normal University, Wuhan, China
- A Compact Fourth-Order-Accurate Embedded Boundary Method for the Wave Equation, Workshop Seminar, July, 2017, Central China Normal University, Wuhan, China
- High order accurate methods for time dependent problems, Colloquium, April 14, 2017, Rensselaer Polytechnic Institute
- High order accurate methods for time dependent problems, 2017, University of Colorado at Boulder
- Energy based discontinuous Galerkin methods, Colloquium, January 11 2017, Sandia National Labs
- Energy based discontinuous Galerkin methods, Colloquium, April 2017, Los Alamos National Labs
- Energy based discontinuous Galerkin methods, Colloquium, January 6 2017, Rice University
- Energy based discontinuous Galerkin methods, Colloquium, November 4 2016, Mathematics Department, Virginia Tech
- Energy based discontinuous Galerkin methods, Seminar, September 13, 2016, Lawrence Livermore National Laboratory
- Lagom Order Accurate Methods for Propagation of Waves in Deterministic and Stochastic Problems, Seminar in Numerical Analysis, June 3 2016, Royal Institute of Technology
- Lagom Order Accurate Methods for Propagation of Waves in Deterministic and Stochastic Problems, Seminar in Numerical Analysis, June 2016, Scientific computing seminar Uppsala university, Uppsala, Sweden
- Multi Level Monte Carlo Methods - Overview and Extensions, Statistics Colloquium UNM, April 2016
- High order accurate methods for time dependent problems. October 2015, UNM
- Hermite Methods for Nonlinear Conservation Laws, Team CHIDES take on the dichotomy of scales, SMU Mathematics Research Colloquium, Thursday, October 8, 2015
- A new discontinuous Galerkin formulation for wave equations in second order form, July 2015 TDB Uppsala University
- Hermite methods, basic elements, extensions and applications, CSRI Seminar Sandia Natl. Labs. Sep. 26 2012
- A pedestrians guide to Hermite methods, basic elements and some more sophisticated things, Scientific computing seminar Uppsala university, Uppsala, Sweden, March 20 2012.
- A pedestrians guide to Hermite methods, basic elements and some more sophisticated things, Numerical analysis seminar KTH, Stockholm Sweden, March 15 2012.
- A fourth-order accurate embedded boundary method for the wave equation, Mechanical engineering seminar Dec. 2 2011, NMSU.
- Arbitrary order Hermite methods for compressible flows, Mechanical engineering seminar Nov. 11 2011, UNM.
- Waves, Jet Noise and Membranes, Colloquium at the Department of Mathematics and Statistics, UNM, Sep. 30.
- Development of Arbitrary-Order Hermite Methods for Simulation and Analysis of Turbulent Jet Noise, Center for Applied Scientific Computing, LLNL, Livermore 15 June 2010.
- Finite Difference Approximations for Time-Dependent Solid-Mechanics, SMU Scientific Computing Seminar, Feb. 25. 2010.
- A Compact Fourth-Order-Accurate Embedded Boundary Method for the Wave Equation, Research colloquium Department of Mathematics, SMU, April 2009.
- A Compact Fourth-Order-Accurate Embedded Boundary Method for the Wave Equation, Colloquium at Department of Numerical Analysis and Computer Science, KTH Stockholm 2009.

- A Compact Fourth-Order-Accurate Embedded Boundary Method for the Wave Equation, Department of Scientific Computing, Uppsala University, Sweden, Oct. 2009.
- A Stable Finite Difference Scheme for the Elastic Wave Equation on Complex Domains with Free Surface Boundary Conditions, Colloquium University of New Mexico, April 17, 2008.
- A General Formulation of Perfectly Matched Layers for Mixed Hyperbolic-Parabolic Systems and its Application to Simulations of Viscous Compressible Flows, Colloquia at Department of Numerical Analysis and Computer Science, KTH Stockholm, Sep. 2007.
- A General Formulation of Perfectly Matched Layers for Mixed Hyperbolic-Parabolic Systems and its Application to Simulations of Viscous Compressible Flows, Department of Scientific Computing, Uppsala University, Sweden, Sep. 2007.
- Perfectly Matched Layers for Wave Propagation Problems on Unbounded Domains: General Formulation, Well-posedness and Stability, ICES seminar, University of Texas at Austin, Apr 11, 2006.
- A Stable Finite Difference Scheme for the Elastic Wave Equation on Complex Domains with Free Surface Boundary Conditions, Applied Math. Seminar Departement of Mathematics, UC Davis, Nov. 5 2007.

Departmental Topical Seminars

- * Structure-preserving Low Rank Scheme for the Lindblad Master Equation, Applied Numerical Analysis Seminar VT, November 2024
- * A numerical methodists adventure in the land of quantum computing, Applied Numerical Analysis Seminar VT, September 2023
- * An introduction to absorbing layers and non-reflecting boundary conditions, CU Boulder, 24 October 2017.
- * Getting rid of the grid Part 1: Embedded boundary methods for wave equations, CU Boulder, September 12 2017.
- * An energy based discontinuous Galerkin formulation for wave equations in second order form, UNM, August 17 2015.
- * Stretching, damping and perfectly matched layers, Applied Math Seminar, Feb. 2 2015, UNM.
- * A Compact Fourth-Order-Accurate Embedded Boundary Method for the Wave Equation, Applied Math Seminar, Jan. 26 2015, UNM.
- * A new discontinuous Galerkin formulation for wave equations in second order form, Applied Math Seminar, Sep. 15 2014, UNM.
- * Hermite Methods for Simulating Compressible Flows, Fluid Mechanics Research Conference, GALCIT, Caltech Nov. 10 2010.

Teaching

Postdoctoral Advisement

- Jiuhua Hu, 2024-
- Måns Andersson, 2025-
- Shixu Meng, 2024-2025 (secondary mentor Daniel Appelö, primary mentor Yingda Cheng). Placement: Assistant Professor University of Texas, Dallas.
- Zhichao Peng, 2020-2023. Placement: Assistant Professor Hong Kong University of Science and Technology
- Yann-Meing Law, 2021-2023. Placement: Assistant Professor, California State University, Long Beach

Doctoral Advisement

- Xi Chen (UNM), Numerical and Analytical Studies of Electromagnetic Waves: Hermite Methods, Supercontinuum Generation, and Multiple Poles in the SEM, 2012. Placement: Researcher at HyPerComp Engineering Inc.
- Adeline Kornelus (UNM); 2017; High order Hermite and discontinuous Galerkin Methods for Hyperbolic Problems. Placement: Postdoc at Arizona State University
- Oleksii Beznosov (UNM); 2020; From Wave Propagation to Spin Dynamics: Mathematical and Computational Aspects. Placement: Postdoc at Los Alamos National Laboratory
- Fortino Garcia; Summer 2021 (CU); Part I: WaveHoltz a new iterative method for frequency domain problems. Part II: Numerical methods for quantum control. Placement: NSF Postdoc at Courant Institute New York University.
- Allen Alvarez Loya; Summer 2022 (CU); High-Order Methods for Wave Phenomena. Placement: NSF Postdoc at Los Alamos National Laboratory.
- Amit Rotem; Fall 2026 (VT, Anticipated); No working title yet.
- Spencer Lee; Fall 2026 (MSU, Anticipated); No working title yet.
- Peter Del Mastro; Spring 2027 (VT, Anticipated); No working title yet.
- Nishan Gurung; Spring 2030 (VT, Anticipated); No working title yet. (First year (rotation) advisor)

Dissertation Committees

- Served as committee member on the dissertation committees at VT: Hengyi Shi, Tyson George, at MSU: Pei Ge, William Sands, Stephen White, Nick Krupansky, Tianyu Yang, Andrés Galindro, Kai Huang, Shuyang Qin, at CU Boulder: Tracy Babb, Jeremy Thompson, Dylan Abrahamsen, David Gunderman, Mingyu Hu, at UNM: Ming Gong, David Bizzozero, Michael R. Payne, Eric Benner, Hao Li (Purdue), Lu Zhang (SMU).

Masters Advisement

- Juan Pablo Madrigal Cianci, UNM 2017, Deterministic and Probabilistic Methods for Seismic Source Inversion.
- Evan Dye, UNM 2014, GPU implementations of Hermite Methods.

All below were co-advised with Prof. G. Kreiss.

- Mohammad Ali Etaati, KTH, Sweden, 2005. An Absorbing Layer for Non-linear Wave equations: First Order Formulation.
- Neda Sepasian, KTH, Sweden, 2005. An Absorbing Layer for Non-linear Wave equations: Second Order Formulation.
- Maria Fröling, KTH, Sweden, 2004. A Numerical Investigation of a Perfectly Matched Layer for Computational Aero Acoustics.
- Mohamad Motamed, KTH, Sweden, 2003. PML Methods for Aero Acoustics Computations.
- Svante Svensson-Frey, KTH, Sweden, 2003. A Comparison of Non-Reflecting Boundary Conditions for the Linearized Euler Equation.

Undergraduate Student Mentoring

Since Fall 2011 I have advised the following undergraduate students. The advisement ranges from giving advice on what classes to take to where to apply for a job or to graduate school to writing letters of recommendation etc.: Jack Kelley, Acosta Kristina, Black Sarah, Cartee Shannon, Dukes Timothy, McCullough Theresa, Sachs Lauren, Sharp Christopher, Ulibarri Steven, Young Reed, Rodrigo Osuna Orozco, Martinez Melanie, Chavez Christina, Castle Carlin and Areley Miramontes, Dominic Gomez, Donald, Aaron, Legits, Cairn Overturf, Jeanette Varela, Jorge Velarde, Luke Perelli, Alex Sietsma.

Classroom Teaching at VT

- Spring 2026 Mathematical Modeling: Methods and Tools II, CMDA 3606 (two sections).
- Spring 2025 Mathematical Modeling: Methods and Tools II, CMDA 3606.

Fall 2024 Numerical Linear Algebra, MATH 5424.

Fall 2023 Mathematical Modeling: Methods and Tools II, CMDA 3606.

[Classroom Teaching at MSU](#)

Spring 2023 Methods for Parallel Computing, CMSE 401.

Fall 2022 Numerical Linear Algebra, MTH 850.

Fall 2021 Numerical Methods, MTH 451.

Spring 2021 Numerical Linear Algebra, CMSE 823.

Fall 2020 Numerical Linear Algebra, MTH 850.

[Classroom Teaching at CU Boulder](#)

Spring 2020 High Performance Computing, APPM 4720/5720.

Fall 2019 APPM 1350: Calculus 1 for Engineers, 106 undergraduate students.

Fall 2019 APPM 5600: Numerical Analysis 1, 35 graduate students.

Fall 2018 Intro to numerical partial differential equations, APPM 6610, 10 graduate students.

Fall 2018 Intermediate Numerical Analysis I, APPM/MATH 4650, 80 undergraduate students.

Spring 2017 High Performance Computing, APPM 4720/5720, 12 undergraduate / graduate students.

Fall 2017 Intermediate Numerical Analysis I, APPM/MATH 4650, 52 undergraduate students.

[Classroom Teaching at UNM](#)

Spring 2017 Vector Analysis, MATH 311, 30 undergraduate students.

Fall 2016 Vector Analysis, MATH 311, 23 undergraduate students.

Introduction to Scientific Computing, CS/MATH 471, 22 students.

Spring 2016 Numerical linear algebra, MATH 504, 12 students.

Special Topic: Advanced Numerical Methods for ODE, MATH 579, 10 graduate students.

Sem: Applied Math, MATH 679, 4 graduate students

Fall 2015 Intro Numerical Computing, CS/MATH 375, 30 undergraduate students.

Introduction to Scientific Computing, CS/MATH 471, 26 students.

Sem: Applied Math, MATH 679, 2 graduate students

Spring 2015 Linear Algebra with Apps, MATH 314, 31 undergraduate students.

Special Topic: Numerical Analysis (Finite Element Analysis), MATH 579, 11 graduate students.

Sem: Applied Math, MATH 679, 4 graduate students

Fall 2014 Intro to Numerical Approx & Diff. Eq., MATH 505, 12 graduate students.

Introduction to Scientific Computing, CS/MATH 471, 16 students.

Sem: Applied Math, MATH 679, 2 graduate students

Reading and Research, MATH 650, one graduate student.

Fall 2013 Intro to Numerical Approx & Diff. Eq., MATH 505, 5 graduate students.

Intro Numerical Computing, CS/MATH 375, 16 undergraduate students.

Reading and Research, MATH 650, one graduate student.

Spring 2013 Intro Numerical Computing, CS/MATH 375, 21 undergraduate students.

Linear Algebra with Apps, MATH 314, 36 undergraduate students.

Reading and Research, MATH 650, one graduate student.

Fall 2012 Intro Numerical Computing, CS/MATH 375, 13 undergraduate students.

Special Topic: Numerical Analysis (Computational Fluid Dynamics), MATH 579, 7 graduate students.

Reading and Research, MATH 650, one graduate student.

Summer 2012 MCTP mini course on numerical analysis, about 25 undergraduate students.

Spring 2012 Intro Numerical Computing, CS/MATH 375, 20 undergraduate students.

Reading and Research, MATH 650, one graduate student.

Fall 2011 Intro Numerical Computing, CS/MATH 375, 14 undergraduate students.

Linear Algebra with Apps, MATH 314, 44 undergraduate students.

Teaching at Caltech

Spring 2009 Computational Fluid Dynamics Part 2, AE232. Instructor, 12 graduate and undergraduate students.

Fall 2008 Computational Fluid Dynamics Part 1, AE232. Instructor, 12 graduate and undergraduate students.

Teaching at Royal Institute of Technology

Spring 2006 Numerical Methods Basic Course I, 2D1210. Instructor, lectures, recitation and laboratory work, Lectures have about 80 students, recitations about 25.

2005 Math. Models, Analysis and Simulation, 2D1244, Recitations and laboratory work, about 25 students.

2005 Numerical Treatment of Diff. Eq, 2D1255, Recitations and laboratory work, about 25 students.

2001–2003 Applied Numerical Methods II, 2D1250, Recitations and laboratory work, about 25 students.

2002–2006 Numerical Methods, Basic Course I & II, 2D1210 & 2D1240, Recitations and laboratory work, about 25 students.

Curriculum Development

- Developed the course material for Special Topic: Finite Element Analysis MATH 579. Spring 2015.

- Modernized the course content of Math/CS 471 Introduction to Scientific Computing to include version control with git, openMP and MPI, Spring 2014.

- Developed the course material for Special Topic: Numerical Analysis (Computational Fluid Dynamics), MATH 579. Fall 2012.

- Developed material for the one week introduction to numerical analysis. Summer 2012.

- Developed several new homework / project sets for Math 375, 2012.

Service

Editorships

2022– Associate editor Numerical Analysis and Scientific Computation (specialty section of Frontiers in Applied Mathematics and Statistics).

2014–2017 Associate editor Rocky Mountain Journal of Mathematics. Handling 10-15 papers per year.

Refereeing for journals and other publications

Journal of Scientific computing (1 per 1 month)

Journal of Computational Physics (1 per 2 months)

Communications in Mathematical Sciences, (1 per year)

Wave Motion (1 per year)

SIAM Journal on Scientific Computing (2 per year)

SIAM Journal on Numerical Analysis (2 per year)

Journal of Computational and Applied Mathematics (3 per year)

AIAA Journal (1 per year)

Applied Computational Mathematics (1 per year)

Reviews for funding organizations

Computational math. NSF, Computational math. for Israel Science Foundation, ASFOR, U.S. Army Corps of Engineers Engineer Research and Development Center, NSF-GRFP, NSF CSSI, NSF NRT, NSF-OAC, DOE ASCR (CAREER, SBIR)

Administrative work on Department, College, University committees

2025/26 Member, Department Executive Committee
2025/26 Chair, Honorifics Committee
2024/25 Member, Department Executive Committee
2024/25 Member, Invasive Species (Destination 2.0) search committee
2024/25 Member, Professor of Practice in Academy of DS search committee
2023/24 Math. Competition committee
2023/24 Chair and Member in two postdoctoral search committees
2022/23 Director: NRT-AI-HDR: Harnessing the data revolution (HDR) to enable predictive multi-scale modeling across STEM
2022/23 Chair, Graduate Studies and Admission Committee
2022/23 Member, College of Natural Science Award Committee
2022/23 Member, Promotion and Tenure Committee
2021/22 Chair, Graduate Studies and Admission Committee
2021/22 Member, ECAC
2021/22 Member, College of Natural Science Award Committee
2021/22 Member, Hiring committee quantum algorithms (CMSE)
2020/21 Chair, Graduate Studies and Admission Committee
2020/21 Member, College of Engineering Hearing Committee
2020/21 Member, College of Natural Science Award Committee
2020/21 Member, Thesis citation ad hoc committee
2020/21 Member, Promotion and Tenure Committee
2020/21 Qualify Exam Examiner MTH & CMSE
2020/21 Early Start Grad Student MTH@MSU Committee
2019/20 Member, Graduate Committee
2019/20 Member, Chair's Advisory
2019/20 Member, Ad hoc Multi-year Hiring Committee
2019/20 Member, Promotion and Tenure Committee
2019/20 Member, Post Tenure Review Committee
2019/20 Member, Arts & Science Council & Arts & Science Sub Committee, A&S budget committee
2018/19 Chair of Colloquium committee
2018/19 Chair of search committee in numerical analysis / computational mathematics search
2018/19 Member of the graduate committee
2018/19 Member of College of Arts and Sciences budget committee
2018/19 Member of mid-review committee
2017/18 Member of the graduate committee
2015/16 Member of Center for Applied Scientific Computing Internal Advisory Board
2016/17 Faculty Senator
2016/17 Member of the Putnam preparation committee
2016/17 Member of the UNM-PNM Mathematics contest committee

- 2015/16 Member of the Undergraduate committee.
- 2014/15 Member of the NSF CC IIE Campus Networking Infrastructure grant Research Network Faculty Advisory Committee
- 2014/15 Computer use committee.
- 2013/14 Webpage committee.
- 2012/13 Member of the search committee for 2 applied math positions.
- [Service to the community](#)
- 10/2025-5/2027 Member of the Organizing Committee SIAM CSE 2027.
- 10/2025-9/2026 Member of the Organizing Committee WAVES 2026.
- 1/1/2025-12/31/2027 Member of SIAM Education Committee.
- 2024 Opponent for PhD thesis defense Gustav Eriksson, Uppsala University
- 2019 Opponent for PhD thesis defense Andrea Alessandro, Ruggiu, Linköping University
- 2016 Opponent for Licentiate Thesis, Gabriela Malenova, Royal Institute of Technology
- 2024 External evaluator PhD thesis in mathematics, Australian National University
- Member of the scientific committee for Waves 2024, 16th International Conference on Mathematical and Numerical Aspects of Wave Propagation, June 2024, Berlin, Germany.
- Member of the scientific committee for Waves 2022, 15th International Conference on Mathematical and Numerical Aspects of Wave Propagation, 25-29 July 2022, Paris, France.
- Member of the scientific committee for the 11th International Conference on Theoretical and Computational Acoustics 10-14 March, 2014, Texas A&M University, College Station.
- [Outreach and other service](#)
- 2024 Guest talk on quantum computing in CMDA intro class, November 2024
- 2024 Talk in Virginia Tech. math circle, March 2024
- 2022 Talk in MSU Math-club, Nov 2022
- 2022 Talk in MSU AMS chapter, Nov 2022
- 2015 From Calculus to Waves Outreach to Undergraduates at Navajo Technical University Crownpoint NM, Nov 2015
- 2014–2016 Organizer of the Applied Math. Seminar. Hosted approximately 65 speakers.
- 2013–2016 Faculty sponsor of the UNM Lobo cycling team.
- 2009– I have organized more than 30 mini-symposiums at international conferences like SIAM Annual Meetings, SIAM Computational Science and Engineering, Waves, ICOSAHOM etc.
- 2009– As a service to graduate students from other universities. For example I have hosted Kenneth Duru, Stanford (visited me one week at Caltech), Kristoffer Virta, Uppsala University (visited UNM 2 x 3 months), Chang Young, SMU (visited UNM for one week), Kurt Stein (visited UNM one week) and John Lagrone SMU (visited UNM Nov-Dec 2015), Elliot Backman & Andreas Granath at VT.