# Tobin A. Driscoll

## Professional experience

### University of Delaware

- Unidel Chaired Professor of Mathematical Sciences *2023–present*
- Professor, Department of Mathematical Sciences *2010–present*
- Affiliated Faculty, Department of Biomedical Engineering *2010–present*
- Associate Professor, Department of Mathematical Sciences *2004–2010*
- Assistant Professor, Department of Mathematical Sciences *2000–2004*

### University of Colorado at Boulder

- Postdoctoral research fellow, Department of Applied Mathematics *1996–1999*

## Education

- Ph.D. in Applied Mathematics, Cornell University (supervisor: Lloyd N. Trefethen) *1991–1996*
- B.S. in Mathematics with honors, B.S. in Physics, Pennsylvania State University *1987–1991*

## Honors and awards

- Unidel Chaired Professorship, University of Delaware *2023*
- Outstanding Scholar Award, College of Arts & Sciences, University of Delaware *2014*
- Winner, 100 Digit Challenge (SIAM) *2002*
- NSF VIGRE Postdoctoral Fellow, University of Colorado *1999–2000*
- NSF Mathematical Sciences Postdoctoral Research Fellow *1996–1999*
- SIAM Outstanding Paper Prize *1999*
- Runner-up, Richard C. DiPrima Dissertation Prize *1998*
- Second Prize, Leslie Fox Competition *1997*
- NSF Graduate Research Fellow *1991–1994*

## Recent grants

- R. J. Braun (PI), T. A. Driscoll (co-PI). Models for Tear Film Structure, Dynamics and Parameter Identification. NSF DMS-1909846, $375,000. *2019–2022*
- R. J. Braun (PI), T. A. Driscoll, and K. L. Maki (co-PIs). Collaborative Research: Tear Film Dynamics: Modeling, Blinking, and Computation. NSF DMS-1412085, $375,003. *2014–2017*
- M. McCulloch (PI), T. A. Driscoll, and G. Schleiniger (co-PIs). Data driven mathematical modeling of the hypoplastic left heart syndrome circulation. NIH Delaware INBRE III, $60,724. *2014–2016*
- T. A. Driscoll. Special support from The MathWorks, Inc. *2013–2015*

### Books

- T. A. Driscoll and R. J. Braun. *Fundamentals of Numerical Computation*, **online edition** in Julia, MATLAB, and Python *2025*
- T. A. Driscoll and R. J. Braun. *Fundamentals of Numerical Computation: Julia Edition*, Society for Industrial and Applied Mathematics *2022*
- L. N. Trefethen, A. Birkisson, and T. A. Driscoll. *Exploring ODEs*, Society for Industrial and Applied Mathematics *2018*

- T. A. Driscoll and R. J. Braun. *Fundamentals of Numerical Computation*, Society for Industrial and Applied Mathematics *2017*
- T. A. Driscoll, N. Hale, and L. N. Trefethen, eds. *Chebfun Guide*, 1st edition. Oxford, UK *2014*
- T. A. Driscoll, *Learning MATLAB*, Society for Industrial and Applied Mathematics *2009*
- T. A. Driscoll and L. N. Trefethen. *Schwarz–Christoffel Mapping*, Cambridge University Press *2002*

**Book chapters**

- R. J. Braun, T. A. Driscoll, and C. G. Begley, "Mathematical Models of the Tear Film," in *Ocular Fluid Dynamics: Anatomy, Physiology, Imaging Techniques, and Mathematical Modeling*, Springer-Birkhäuser, 2019.
- T. A. Driscoll and B. Fornberg. Padé-based interpretation and correction of the Gibbs phenomenon. In *Advances in the Gibbs Phenomenon*, ed. by A. Jerri, Sigma Sampling Publishing, Potsdam, NY, 2007.
- T. A. Driscoll and L. N. Trefethen. Numerical construction of conformal maps. Appendix to *Fundamentals of Complex Analysis with Applications to Engineering, Science, and Mathematics*, 3rd edition, by E. D. Saff and A. D. Snider, Prentice Hall, 2002.

**Refereed articles with over 100 citations (according to Google Scholar as of June 2026)**

- Trefethen, L. N., Trefethen, A. E., Reddy, S. C., and Driscoll, T. A. (1993). Hydrodynamic stability without eigenvalues. Science, 261(5121), 578–584. **10.1126/science.261.5121.578**
- Driscoll, T. A., and Fornberg, B. (2002). **Interpolation in the limit of increasingly flat radial basis functions.** Computers and Mathematics with Applications, 43(3–5), 413–422. **10.1016/s0898-1221(01)00295-4**
- Driscoll, T. A. (1996). **Algorithm 756: A MATLAB toolbox for Schwarz-Christoffel mapping.** ACM Transactions on Mathematical Software (TOMS), 22(2), 168–186. **10.1145/229473.229475**
- Fornberg, B., Driscoll, T. A., Wright, G., and Charles, R. (2002). **Observations on the behavior of radial basis function approximations near boundaries.** Computers and Mathematics with Applications, 43(3–5), 473–490. **10.1016/s0898-1221(01)00299-1**
- Driscoll, T. A., and Heryudono, A. R. H. (2007). **Adaptive residual subsampling methods for radial basis function interpolation and collocation problems.** Computers and Mathematics with Applications, 53(6), 927–939. **10.1016/j.camwa.2006.06.005**
- Fornberg, B., and Driscoll, T. A. (1999). **A fast spectral algorithm for nonlinear wave equations with linear dispersion.** Journal of Computational Physics, 155(2), 456–467. **10.1006/jcph.1999.6351**
- Driscoll, T. A., Toh, K.-C., and Trefethen, L. N. (1998). **From Potential Theory to Matrix Iterations in Six Steps.** SIAM Review, 40(3), 547–578. **10.1137/S0036144596305582**
- Baggett, J. S., Driscoll, T. A., and Trefethen, L. N. (1995). **A mostly linear model of transition to turbulence.** Physics of Fluids, 7(4), 833–838. **10.1063/1.868606**
- Driscoll, T. A., and Fornberg, B. (2001). **A Padé-based algorithm for overcoming the Gibbs phenomenon.** Numerical Algorithms, 26(1), 77–92. **10.1023/A:1016648530648**
- Ghrist, M., Fornberg, B., and Driscoll, T. A. (2000). **Staggered time integrators for wave equations.** SIAM Journal on Numerical Analysis, 38(3), 718–741. **10.1137/s0036142999351777**
- Driscoll, T. A., and Vavasis, S. A. (1998). **Numerical conformal mapping using cross-ratios and Delaunay triangulation.** SIAM Journal on Scientific Computing, 19(6), 1783–1803. **10.1137/s1064827596298580**
- Driscoll, T. A., Bornemann, F., and Trefethen, L. N. (2008). **The chebop system for automatic solution of differential equations.** BIT Numerical Mathematics, 48(4), 701–723. **10.1007/s10543-008-0198-4**
- Driscoll, T. A. (1997). **Eigenmodes of isospectral drums.** SIAM Review, 39(1), 1–17. **10.1137/S0036144595285069**
- Driscoll, T. A. (2005). **Algorithm 843: Improvements to the Schwarz-Christoffel toolbox for MATLAB.** ACM Transactions on Mathematical Software (TOMS), 31(2), 239–251. **10.1145/1067967.1067971**
- Driscoll, T. A., and Hale, N. (2015). **Rectangular spectral collocation.** IMA Journal of Numerical Analysis, 36(1), 108–132. **10.1093/imanum/dru062**
- Platte, R. B., and Driscoll, T. A. (2004). **Computing eigenmodes of elliptic operators using radial basis functions.** Computers and Mathematics with Applications, 48(3–4), 561–576. **10.1016/j.camwa.2003.08.007**
- Platte, R. B., and Driscoll, T. A. (2006). **Eigenvalue stability of radial basis function discretizations for time-dependent problems.** Computers and Mathematics with Applications, 51(8), 1251–1268. **10.1016/j.camwa.2006.04.007**

**Refereed articles with 50–100 citations**

- Platte, R. B., and Driscoll, T. A. (2005). **Polynomials and Potential Theory for Gaussian Radial Basis Function Interpolation.** SIAM Journal on Numerical Analysis, 43(2), 750–766. **10.1137/040610143**
- Heryudono, A., Braun, R. J., Driscoll, T. A., Maki, K. L., Cook, Lp., and PE, K.-S. (2007). **Single-equation models for the tear film in a blink cycle: Realistic lid motion.** Mathematical Medicine and Biology-a Journal of The Ima, 24(4), 347–377. **10.1093/imammb/dqm004**
- Driscoll, T. A. (2010). **Automatic spectral collocation for integral, integro-differential, and integrally reformulated differential equations.** Journal of Computational Physics, 229(17), 5980–5998. **10.1016/j.jcp.2010.04.029**
- G. Wojcik, B. Fornberg, R. Waag, J. Mould, T. A. Driscoll, and L. Nikodym. Pseudospectral methods for large-scale bioacoustic models. Proceedings of the 1997 IEEE Ultrasonics Symposium.
- Driscoll, T. A. (2002). **A composite Runge–Kutta method for the spectral solution of semilinear PDEs.** Journal of Computational Physics, 182(2), 357–367. **10.1006/jcph.2002.7127**
- Goano, M., Bertazzi, F., Caravelli, P., Ghione, G., and Driscoll, T. A. (2001). **A general conformal-mapping approach to the optimum electrode design of coplanar waveguides with arbitrary cross section.** IEEE Transactions on Microwave Theory and Techniques, 49(9), 1573–1580. **10.1109/22.942569**
- Braun, R., Usha, R., McFadden, G., Driscoll, T. A., Cook, L., and King-Smith, P. E. (2012). **Thin film dynamics on a prolate spheroid with application to the cornea.** Journal of Engineering Mathematics, 73(1), 121–138. **10.1007/s10665-011-9482-4**
- Heryudono, A. R. H., and Driscoll, T. A. (2010). **Radial basis function interpolation on irregular domain through conformal transplantation.** Journal of Scientific Computing, 44(3), 286–300. **10.1007/s10915-010-9380-3**
- Driscoll, T. A., and Fornberg, B. (1999). **Block pseudospectral methods for Maxwell's equations II: Two-dimensional, discontinuous-coefficient case.** SIAM Journal on Scientific Computing, 21(3), 1146–1167. **10.1137/s106482759833320x**
- Pelesko, J. A., and Driscoll, T. A. (2006). **The effect of the small-aspect-ratio approximation on canonical electrostatic MEMS models.** Journal of Engineering Mathematics, 53(3–4), 239–252. **10.1007/s10665-005-9013-2**
- Birkisson, A., and Driscoll, T. A. (2012). **Automatic Fréchet differentiation for the numerical solution of boundary-value problems.** ACM Transactions on Mathematical Software, 38(4), 1–29. **10.1145/2331130.2331134**

**Refereed articles with 20–49 citations**

- L. N. Trefethen and T. A. Driscoll. Schwarz–Christoffel mapping in the computer era. Proceedings of the International Congress of Mathematicians, Vol. III (Berlin, 1998). *Doc. Math.* 1998, Extra Vol. III, 533–542 (electronic).
- Driscoll, T. A., and Trefethen, L. N. (1996). **Pseudospectra for the wave equation with an absorbing boundary.** Journal of Computational and Applied Mathematics, 69(1), 125–142. **10.1016/0377-0427(95)00021-6**
- DeLillo, T. K., Driscoll, T. A., Elcrat, A. R., and Pfaltzgraff, J. A. (2008). **Radial and circular slit maps of unbounded multiply connected circle domains.** Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences, 464(2095), 1719–1737. **10.1098/rspa.2008.0006**
- Driscoll, T. A., Nakatsukasa, Y., and Trefethen, L. N. (2024). **AAA rational approximation on a continuum.** SIAM Journal on Scientific Computing, 46(2), A929–A952, 2024. **10.1137/23M1570508**
- Driscoll, T. A., and Fornberg, B. (1998). **A Block Pseudospectral Method for Maxwell's Equations: I. One-Dimensional Case.** J. Comput. Phys., 140, 1–19. **10.1006/jcph.1998.5883**
- Braun, R. J., Driscoll, T. A., Begley, C. G., King-Smith, P. E., and Siddique, J. I. (2018). **On tear film breakup (TBU): Dynamics and imaging.** Mathematical Medicine and Biology, 35(2), 145–180. **10.1093/imammb/dqw023**
- Maki, K. L., Braun, R. J., Driscoll, T. A., and King-Smith, P. E. (2008). **An overset grid method for the study of reflex tearing.** Math. Med. Biol., 25, 187–214. **10.1093/imammb/dqn013**
- Driscoll, T. A., and Maki, K. L. (2007). **Searching for rare growth factors using multicanonical Monte Carlo methods.** SIAM Review, 49(4), 673–692. **10.1137/050637662**
- Li, L., Braun, R. J., Driscoll, T. A., Henshaw, W. D., Banks, J. W., and King-Smith, P. E. (2016). **Computed tear film and osmolarity dynamics on an eye-shaped domain.** Mathematical Medicine and Biology, 33(2), 123–157. **10.1093/imammb/dqv013**

- Deng, Q., Braun, R. J., Driscoll, T. A., and King-Smith, P. E. (2013). **A model for the tear film and ocular surface temperature for partial blinks.** Interfacial Phenomena and Heat Transfer, 1(4), 357–381. **10.1615/interfacphenomheattransfer.v1.i4.40**
- Usher, D. C., Driscoll, T. A., Dhurjati, P., Pelesko, J. A., Rossi, L. F., Schleiniger, G., Pusecker, K., and White, H. B. (2010). **A transformative model for undergraduate quantitative biology education.** CBE Life Sciences Education, 9(3), 181–188. **10.1187/cbe.10-03-0029**
- DeLillo, T. K., Driscoll, T. A., Elcrat, A. R., and Pfaltzgraff, J. A. (2006). **Computation of multiply connected Schwarz-Christoffel maps for exterior domains.** Computational Methods and Function Theory, 6(2), 301–315. **10.1007/BF03321616**
- Deng, Q., Braun, R., and Driscoll, T. A. (2014). **Heat transfer and tear film dynamics over multiple blink cycles.** Physics of Fluids, 26(7), 071901. **10.1063/1.4887341**

**Recent refereed proceedings**

- Tichenor, A. A., P. Situ, T. A. Driscoll, C. G. Begley, and R. J. Braun. "Linking TBU Mechanisms and the Neurosensory Response in Dry Eye Subjects." Investigative Ophthalmology & Visual Science 65, no. 7 (2024): 6572–6572.
- Situ, P., A. A. Tichenor, T. A. Driscoll, C. G. Begley, and R. J. Braun. "Neurosensory Function Changes Induced by Tear Film Instability (TFI)-Related Stress in Dry Eye: A Pilot Study." Investigative Ophthalmology & Visual Science 65, no. 7 (2024): 6566–6566.
- Driscoll, T. A., A. A. Tichenor, P. Situ, R. J. Braun, and C. G. Begley. "Optimized Models of Tear Breakup (TBU) Mechanisms in Dry-Eye (DE) and Non-DE Subjects." Investigative Ophthalmology & Visual Science 65, no. 7 (2024): 6559–6559.
- R. J. Braun, T. Driscoll, C. Begley, P. Situ, A. Tichenor, and R. Luke, "Tear Breakup (TBU) Analysis with Fluorescence (FL) and Thermal (TH) imaging," Investigative Ophthalmology & Visual Science, vol. 64, no. 8, pp. 186–186, Jun. 2023.
- R. J. Braun, T. A. Driscoll et al., "Data and Analysis from Tear Breakup (TBU) in Normal Subjects," Investigative Ophthalmology & Visual Science, vol. 63, no. 7, pp. 3950-A0230, Jun. 2022.
- R. A. Luke et al., "Fitting Simplified Models to Machine Learning-Identified Tear Film Breakup," in Investigative Ophthalmology & Visual Science, Jun. 2021, vol. 62, p. 1315.

**Software**

- T. A. Driscoll. **RationalFunctionApproximation.jl**. Approximation by rational functions in Julia. *2025–*
- T. A. Driscoll. **ComplexRegions.jl**. Complex regions and paths in Julia. *2019–*
- L. N. Trefethen and others, **Chebfun**. Numerical computing with functions. *2008–2014*
- T. A. Driscoll. **Schwarz–Christoffel Toolbox for MATLAB**. Conformal maps to regions bounded by polygons. *1994–2002*

## Graduate students supervised

Yuxing Zhou, Ph. D. candidate; Arnab Roy, Ph. D. candidate; Qinying Chen, Ph. D. expected 2026; Kevin Aiton, Ph.D.; Shawn Abernethy, M.S. with thesis; Quan Deng, Ph.D.; Alfa Heryudono, Ph.D.; Rodrigo Platte, Ph.D.

## Service highlights

**Delaware**

- Director of Graduate Studies (Delaware), 2011–2014
- Director of Undergraduate Studies (Delaware), 2018–2021
- Chaired ad hoc committee to create B.S. degree in Data Science
- Director of the Master of Science program in Data Science, 2023–2025
- ADVANCE Fellow and Senior Fellow, 2020–2023
- University Strategic Planning Working Group on Redefining Creativity, Innovation and Entrepreneurship, 2021

**Profession**

- Editor-in-Chief of the SIAM book series on Software, Environments, and Tools, 2026–present
- Communicating Editor of *Advances in Computational Mathematics*, 2019–present

- At-Large Member of the SIAM Council, 2015–2018
- Associate Editor of *Journal of Engineering Mathematics*, 2010–2015
- Associate Editor of the *SIAM Journal on Scientific Computing*, 2008–2014