# Charles Puelz

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University of North Carolina, Chapel Hill
Department of Mathematics
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## Professional Appointments

- Postdoctoral Research Associate, Mathematics, University of North Carolina, Chapel Hill, July 2017–
  advisor: Boyce Griffith

## Education

- Ph.D. in Computational and Applied Mathematics, Rice University, Houston, TX, May 2017
  title: *Numerical methods and applications for reduced models of blood flow*
  advisors: Beatrice Riviere and Craig G. Rusin
- M.A. in Computational and Applied Mathematics, Rice University, Houston, TX, May 2013
  title: *Improved spectral calculations for discrete Schrödinger operators*
  advisor: Mark Embree
- B.A. in Mathematics and B.A. in Physics, Wesleyan University, Middletown, CT, May 2011
  Phi Beta Kappa and honors in mathematics

## Journal Articles

1. "A computational study of the Fontan circulation with fenestration or hepatic vein exclusion." C. Puelz, S. Acosta, B. Rivière, D. Penny, K. Brady, C. G. Rusin. submitted 2017.
2. "Cardiovascular mechanics in the early stages of pulmonary hypertension: a computational study." S. Acosta, C. Puelz, B. Rivière, D. Penny, K. Brady, C. G. Rusin. *Biomechanics and Modeling in Mechanobiology*, accepted 2017.
3. "A priori error estimates of Adams-Bashforth discontinuous Galerkin methods for scalar nonlinear conservation laws." C. Puelz, B. Rivière. *Journal of Numerical Mathematics*, accepted 2017.
4. "Convergence of IPDG for coupled time–dependent Navier–Stokes and Darcy equations." N. Chabaane, V. Girault, C. Puelz, B. Rivière. *Journal of Computational and Applied Mathematics*, accepted 2017.
5. "Comparison of reduced blood flow models using Runge–Kutta discontinuous Galerkin methods." C. Puelz, S. Čanić, B. Rivière, C. G. Rusin. *Applied Numerical Mathematics*, 115, pp. 114–141, 2017.
6. "Numerical method of characteristics for one–dimensional blood flow." S. Acosta, C. Puelz, B. Rivière, C. G. Rusin, D. Penny. *Journal of Computational Physics*, 294, pp. 96-109, 2015.
7. "Spectral approximation for quasiperiodic Jacobi operators." C. Puelz, M. Embree, J. Fillman. *Integral Equations and Operator Theory*, 82(4), pp. 533-554, 2015.

## Theses and Technical Reports

1. *Numerical methods and applications for reduced models of blood flow*, PhD Thesis, Rice University, 2017.
2. *Improved spectral calculations for discrete Schrödinger operators*, Masters Thesis, Rice University, 2013.
3. "Visualizing the Pareto Surface." B. Hosseini, G. Liu, C. Puelz, S. Tracht, M. Smilovic. *IMA Preprint Series* 2401, 2012.

## Computer Skills

- Computer Languages: FORTRAN, *C*, *C*$^{++}$

- Tools: SVN, Emacs, Git, Eclipse, netbeans, MATLAB
- Experience with: Python

## Honors and Awards

- Alan Weiser Memorial Travel Award, Rice CAAM department, April 2016.
- National Library of Medicine training fellowship through the Gulf Coast Consortia for the Quantitative Biomedical Sciences, awarded 2014, renewed 2015 and 2016.
- Honorable Mention in the National Science Foundation GRFP competition, April 2013.
- SIAM Student Chapter Certificate of Recognition, April 2013.
- Rae Shortt Prize, Wesleyan math department, April 2010.
- Robertson Math Award, Wesleyan math department, April 2009.

## Professional Membership

- SIAM, AMS

## Teaching

- Teaching assistant for matrix analysis and numerical PDE, Rice University, Fall 2014, Spring 2015.
- Lab instructor for matrix analysis lab, Rice University, Spring 2013.
- Learning assistant, Rice University, Fall 2012.
- Teaching Assistant, Tutor, and Grader, Wesleyan University, Spring 2008–Spring 2011.

## Service and Experience

- Co–organizer of an AMS minisymposium at the Joint Mathematics Meeting. Minisymposium entitled "Mathematics in Physiology and Medicine." January 5, 2017.
- SIAM student chapter president, Rice University, Fall 2012–Spring 2013.
- Research Assistant under the direction of Laurent Demanet, Massachusetts Institute of Technology, Summer 2010.
- Research Assistant under the direction of Tsampikos Kottos, Max Planck Institute for Dynamics and Self–Organization, Summer 2009.

## Conferences and Workshops

- Finite Element Rodeo, University of Houston, Houston, TX, March 3–4, 2017.
- Joint Mathematics Meeting, Atlanta, GA, January 4–7, 2017.
- SIAM Life Sciences, Boston, MA, July 11–14, 2016.
- National Library of Medicine Informatics Training Conference, Ohio State University, Columbus, OH, June 27–28, 2016.
- AMS MRC: Mathematics in Physiology and Medicine, Snowbird Resort, Snowbird, UT, June 19–25, 2016.
- Finite Element Rodeo, Texas A&M University, College Station, TX, March 4–5, 2016.
- AMIA Annual Symposium, San Francisco, CA, November 14–18, 2015.
- 25th Keck Annual Research Conference, Bioscience Research Collaborative, Houston, TX, October 15–16, 2015.
- National Library of Medicine Informatics Training Conference, National Institutes of Health, Bethesda, MD, June 23–24, 2015.
- Advanced Numerical Methods in the Mathematical Sciences, Texas A&M University, College Station, TX, May 4–7, 2015.

- Finite Element Rodeo, Southern Methodist University, Dallas, TX, February 27–28, 2015.
- Joint Mathematics Meeting, San Antonio, TX, January 10–13, 2015.
- National Library of Medicine Informatics Training Conference, University of Pittsburgh, Pittsburgh, PA, June 17–18, 2014.
- 24th Keck Annual Research Conference, Bioscience Research Collaborative, Houston, TX, November 7, 2014.
- Gene Golub SIAM Summer School on Numerical Linear Algebra, Fudan University, Shanghai, China, July 22–August 9, 2013.
- Recent Advances in Harmonic Analysis and Spectral Theory, Texas A&M University, College Station, TX, August 6–10, 2012.
- Mathematical Modeling in Industry XVI, University of Calgary, Calgary, Alberta, July 18–27, 2012.

## Talks and Posters

1. "Numerical methods for blood flow"
   talk at the Rice CAAM department graduate colloquium, Houston, TX, March 2017.
2. "Reduced models for blood flow"
   talk at the Finite Element Rodeo, University of Houston, Houston, TX, March 2017.
3. "One–dimensional blood flow models: analysis and applications"
   talk at SIAM Life Sciences, Boston, MA, July 2016.
4. "One–dimensional model of blood flow discretized with Runge–Kutta discontinuous Galerkin methods"
   poster at SIAM Life Sciences, Boston, MA, July 2016.
5. "Computational modeling of hypoplastic left heart syndrome for improved decision support"
   poster at NLM Informatics Training Conference Ohio State University, Columbus, OH, June 2016.
6. "Discontinuous Galerkin discretizations of one–dimensional blood flow models"
   talk at the Finite Element Rodeo, Texas A&M University, College Station, TX, March 2016.
7. "Mathematical modeling of congenital heart defects and abnormal hemodynamic physiologies"
   poster at the Sigma Xi (Rice and TMC chapter) holiday event, Houston, TX, December 2015.
8. "Blood flow model for improved decision support"
   poster at the AMIA Annual Symposium, San Francisco, CA, November 2015
9. "A closed–loop reduced hemodynamic model for the simulation of blood flow in patients with hypoplastic left heart syndrome"
   poster at the 25th Keck Annual Research Conference, Bioscience Research Collaborative, Houston, TX, October 2015.
10. "Numerical methods for reduced blood flow models"
    Seminar talk at the National Institute of Standards and Technology
    Gaithersburg, MD, June 2015.
11. "Discontinuous Galerkin methods for reduced blood flow models"
    poster at the Advanced Numerical Methods in the Mathematical Sciences conference, Texas A&M University, College Station, TX, May 2015.
12. "Discontinuous Galerkin methods for reduced blood flow models"
    talk at the Finite Element Rodeo, Southern Methodist University, Dallas, TX, May 2015.
13. "An $O(N^2)$ eigenvalue algorithm for period–$N$ Jacobi operators"
    talk at the Joint Mathematics Meeting, San Antonio, TX, January 2015.
14. "Numerical methods for one–dimensional blood flow"
    poster at the Keck Annual Research Conference, Bioscience Research Collaborative, Houston, TX, November 2014.

15. "Spectra of Schrödinger operators via transfer matrices"
talk at the Rice CAAM department graduate colloquium, Houston, TX, January 2014.

16. "Electrical networks and Polya's theorem"
talk at the Rice CAAM department graduate colloquium, Houston, TX, January 2012.

17. "Random walks and electrical networks"
talk for the Wesleyan math department senior honors presentation, Wesleyan University, Middletown, CT, April 2011.

18. "Oil drilling and mathematics"
talk at Wesleyan math department undergraduate colloquium, Middletown, CT, February 2011.