

# Prince Chidyagwai

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## Academic Positions

Assistant Professor  
Loyola University Maryland  
Department of Mathematics & Statistics  
July 2013 - Present  
Baltimore, MD

Research Assistant Professor  
Temple University  
Department of Mathematics  
July 2010-June 2013  
Philadelphia, PA

Research Visitor  
MIT  
Department of Mathematics  
May 2011-June 2011  
Cambridge, MA

## Education

**Rice University**, Houston, Texas USA  
Ph.D., Computational and Applied Mathematics, 2010

- Thesis Advisor: Professor Béatrice Rivière
- Thesis Area: Computational Fluid Dynamics: Theory and Implementation
- Thesis Title: “Coupling Surface Flow and Porous Media Flow”

**University of Pittsburgh**, Pittsburgh, Pennsylvania USA  
M.A., Mathematics, 2007

**Lafayette College**, Easton Pennsylvania USA  
B.S., Mathematics, 2005  
B.A., Computer Science, 2005

- Graduated Cum Laude, Honors in Mathematics

## Research Interests

- Numerical analysis, Scientific computing, Applied mathematics
- Finite element, Discontinuous Galerkin, Finite volume and Finite difference methods
- Transport and flow in porous media
- Medical applications: Numerical simulations of radiative transfer for radiotherapy
- Computational fluid flow: High order numerical techniques for incompressible viscous flow

## Research Support

- NSF Research Grant, Co-PI, DMS-1115269: *Collaborative Research: Numerical approaches for incompressible viscous flow with high order accuracy up to the boundary, September 2011 - August 2014 (with Benjamin Seibold (Temple University) and Rodolfo R. Rosales (MIT))*, \$299,992.
- Summer Research Grant, Loyola University Maryland, 2014

## Awards

- IPAM Workshop travel award, 2017.
- SIAM Early Career travel award, 2015.
- SIAM Early Career travel award, 2011.
- SIAM student travel award, 2009.
- AMS Waldemar J. Trjitzinsky Memorial Award, Fall 2004.
- Carolyn Van Dyke Prize in Computer Science, Lafayette College, Fall 2003.

## Publications

1. P. Chidyagwai, M. Frank, F. Schneider and B. Seibold, A comparative study of limiting strategies in Discontinuous Galerkin schemes for the  $M_1$  model, *Journal of Computational and Applied Mathematics*, 2018, doi: <https://doi.org/10.1016/j.cam.2018.04.017/>
2. P. Chidyagwai, A multilevel decoupling method for the coupled Navier-Stokes/Darcy problem, *Journal of Computational and Applied Mathematics*, Volume 325, 2017, Pages 74-96
3. P. Chidyagwai, S. Ladenheim, and Daniel B. Szyld, Constraint Preconditioning for the Coupled Stokes–Darcy System, *SIAM Journal on Scientific Computing*, Volume 38, Number 2, 2016, Pages A668-A690.
4. D. Zhou, B. Seibold, D. Shirokoff, P. Chidyagwai and R.R. Rosales, Meshfree finite differences for vector Poisson and pressure Poisson equations with electric boundary conditions, *Meshfree methods for Partial Differential Equations VII Lecture Notes in Computational Science and Engineering, Vol 100*, 2015
5. P. Chidyagwai, J-C. Nave, R.R. Rosales and B. Seibold, A comparative study of the efficiency of Jet schemes, *International Journal of Numerical Analysis. Model. B*, Volume 3, Number 3, 2012, Pages 297-306.
6. P. Chidyagwai and B. Rivière, A two-grid method for coupled free flow with porous media flow, *Advances in Water Resources*, Volume 34, Issue 9, September 2011, Pages 1113-1123.
7. P. Chidyagwai, B. Rivière and I. Mishev, On the coupling of finite volume and discontinuous Galerkin method for reservoir simulation problems, *SPE Reservoir Simulation Symposium*, 141971-MS.
8. P. Chidyagwai, B. Rivière, I. Mishev, On the coupling of finite volume and discontinuous Galerkin method for elliptic problems, *Journal of Computational and Applied Mathematics*, Volume 235, Issue 8, February 2011, Pages 2193-2204.
9. P. Chidyagwai and B. Rivière, On the solution of the coupled NavierStokes and Darcy equations, *Computer Methods in Applied Mechanics and Engineering*, Volume 198, Issues 47-48, October 2009, Pages 3806-3820.
10. P. Chidyagwai and B. Rivière, Numerical modelling of coupled surface and subsurface flow systems, *Advances in Water Resources*, Volume 33, Issue 1, January 2010, Pages 92-105.
11. P. Chidyagwai and C.A. Reiter, A local cellular model for growth on quasicrystals, *Chaos, Solitons & Fractals*, Volume 24, Issue 3, May 2005, Pages 803-812.
12. P. Chidyagwai and C.A. Reiter, Auxiliary materials for a local cellular model for growth on quasicrystals,(website) <http://ww2.lafayette.edu/~rieterc/mvp/qcgm/index.html/>, 2005.

## Work in Progress

1. P. Chidyagwai, *Multi-rate decoupling methods for time dependent multi-physics flows*
2. A. Cesmelioglu and P. Chidyagwai, *Numerical analysis of the coupling of free fluid with a poroelastic material*, submitted

## Professional and Society Memberships

- SIAM - Society for Industrial and Applied Mathematics
- Sigma Xi - Scientific Research Honor Society
- Pi Mu Epsilon - Honorary National Mathematics Society

## Conference and Seminar Talks

- *A Computational approach to solving the  $M_1$  model for radiative transport*, Loyola Department of Mathematics and Statistics Seminar, March 2018
- *Finite element decoupling techniques for coupled free flow with porous media flow problems*, Oakland University Mathematics Colloquium, March 2018
- *A multirate decoupling scheme for transient coupled surface-subsurface flows*, MAA Joint Math Meeting, Invited Mini-symposium on Advances in finite element approximations, January 2018
- *A realizability preserving Discontinuous Galerkin method for Radiative Transport*, SIAM Conference on Computational Science and Engineering, March 2017

- *On Finite Element Decoupling Techniques for Coupled Multi-Physics Flows*, Mathematical Association of America MD-DC-VA Section, November, 2016
- *A realizability preserving Discontinuous Galerkin method for radiative transfer*, UMBC Differential Equations seminar, April 2016.
- *Discontinuous Galerkin methods for radiative transfer*, Morgan State University Mathematics seminar, March, 2016.
- *A multivel decoupling method for the coupled Navier–Stokes/Darcy problem*, International Congress on Industrial and Applied math, August, 2015
- *A Realizability preserving Discontinuous Galerkin method for the  $M_1$  radiative transfer model*, SIAM annual meeting, Chicago, July, 2014
- *Multi-level decoupling of coupled free flow with porous media flow systems*, 4th European Seminar on Computing, Pilsen, Czech Republic, June, 2014
- *High order methods for radiative transfer*, SIAM annual meeting, Minneapolis, MN, July. 2012.
- *Coupling finite volume with discontinuous Galerkin methods for elliptic problems*, Lunch Seminar, Aachen University Center for Computational Engineering Science, Aachen, Germany, June. 2012
- *Discontinuous Galerkin methods for 2D moment closures for radiative transfer*, Del-Mar Numerical analysis Day, University of Delaware, April, 2012
- *Discontinuous Galerkin methods for 2D moment closures for radiative transfer*, Mid-Atlantic Numerical Analysis Day, Temple University, Nov, 2011.
- *An introduction to the finite element method and applications to computational fluid flow*, Mathematical Adventures and Diversions talk series, Lafayette College, Nov. 2011.
- *On the coupling of finite volume with discontinuous Galerkin method*, Applied Mathematics and Scientific Computing seminars, Temple University, April, 2011.
- *Poster: Coupling free flow with with porous media flow*, SIAM Conference on Computational Science & Engineering, Reno NV, March, 2011.
- *Coupling free flow with porous media flow*, Applied Mathematics and Scientific Computing seminars, Temple University, Sept, 2010.
- *On the solution of the coupled Navier-Stokes and Darcy equations*, Joint Mathematics Meetings, San Francisco CA, Jan, 2010.
- *Multi-numeric solutions of multi-physics couplings*, Computational and Applied Mathematics Department Numerical Analysis Seminar, Rice University, Fall 2009.
- *Numerical study of coupling free flow and porous media flow*, Finite Element Rodeo, University of Texas at Austin, 2009.
- *A weak solution and a multi-numeric solution of the coupled Navier-Stokes and Darcy equations: numerical results*, Computational and Applied Mathematics Graduate Seminar, Rice University, Fall 2008.
- *A weak solution and a multi-numeric solution of the coupled Navier-Stokes and Darcy equations*, Finite Element Circus, Louisiana State University, 2008.
- *A weak solution and a multi-numeric solution of the coupled Navier-Stokes and Darcy equations*, Finite Element Circus, Cornell University, 2007.
- *A weak solution and a multi-numeric solution of the coupled Navier-Stokes and Darcy equations*, Computational Mathematics Seminar, University of Pittsburgh, Fall 2007.
- *A local model for growth on quasicrystals*, Special session on Undergraduate Research, AMS national meetings, Atlanta, January 2005.
- *The Carpenters Rule Problem*, AMS Regional Meeting, University of Pennsylvania, 2003.
- *The Carpenters Rule Problem*, AMS National Meeting, Baltimore, Undergraduate Research Poster session, January 2003.

**Research students** Dong Zhou (Graduate)(co-advisee with B. Seibold) Thesis area: Computational fluid flow (11/11 - 05/14).

John Edwardson (Undergraduate)(08/12 - 07/13) Project: High order finite element methods.

Todd Reeb (Undergraduate)(12/11 - 05/12). Project: 3D mesh generation and visualization tools.

**Teaching  
Experience**

**Assistant Professor**

Department of Mathematics & Statistics

July 2013- Present  
Loyola University Maryland

- MA 490, Partial Differential Equations (Spring 2018)
- MA 428, Computational Mathematics (Fall 2015, Fall 2017)
- MA 427, Numerical Analysis (Fall 2016)
- MA 351, Calculus III (Spring 2016, Fall 2017)
- MA 252, Calculus II (Fall 2014, Fall 2015)
- MA 251, Calculus I (Fall 2013, Spring 2014)
- MA 151, Applied Calculus (Spring 2016, Fall 2016, Spring 2018)
- MA 107, Mathematics, Numbers and the real world (Fall 2014, Spring 2015)

**Research Assistant Professor**

Department of Mathematics

July 2010-June 2013  
Temple University

- Topics in Numerical Analysis: The Finite element method (Spring 2011)
- Numerical Analysis 1. (Fall 2012)
- Multivariable calculus (Fall 2010, Fall 2011)

**Department  
Service**

- Mathematics contests faculty advisor (Fall 2014 - present)
- Advising for Mathematics majors (Fall 2014 - present)
- Curriculum development for applied mathematics concentration (AY 2014-2015)
- Department representative for *Look Loyola - prospective students open house* (Spring 2016)
- Tutoring and Grading faculty coordinator (Spring 2017 - present)
- Department representative for *Accepted students open house* (Spring 2018)

**University Service**

- Research and Sabbatical Committee member (2017- present)
- Honor council faculty member (2016 - present)
- Judge for Undergraduate Research Colloquium, Spring 2016
- Loyola Multicultural Awareness Program Faculty panel member, August 2017
- CPaMs committee Mathematics representative (Fall 2018 - present)

**Professional  
Service**

- Peer reviewing for academic journals
  - Numerical Methods for Partial Differential Equations*
  - Computational Geosciences*
  - Journal of Computational and Applied Mathematics*
  - Journal of Computational Physics*
  - Water Resources Research*
  - Journal of Mathematical Analysis and Applications*
  - Journal of Numerical Mathematics*
  - SIAM Journal on Scientific Computing*
- NSF proposal review panelist, March 2017
- Session chair for section on Numerical PDEs at SIAM Conference (CSE, 2017)

Date: September 11, 2018