# Cuiyu He

## Contact Information

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University of Georgia (UGA)
1023 D. W. Brooks Dr., Athens, GA, 30605

## Education

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| Aug 2017 Aug 2010 | **Purdue University** **Ph.D. Mathematics**     Advisor: *Prof. Z. Cai* |
| Aug 2017 May 2015 | **Purdue University** **Graduate Certificate in Statistics** |
| June 2010 Dec 2006 | **Dalian University of Technology** **B.S. Mathematics** |

## Work Experience

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| July 2019 Current | **Limited Term Assistant Professor** Department of Mathematics, University of Georgia |
| July 2019 Current | **Honorary Research Fellow** Department of Mathematics, University College London |
| July 2019 Oct 2017 | **Postdoctoral Researcher**     Mentor: *Prof. E. Burman* Department of Mathematics, University College London –*Funded by the* **EPSRC** *grant on* *"Geometrically unfitted finite element methods for inverse identification of geometries and shape optimization"* . |
| Aug 2016 May 2016 | **Summer Intern**     Mentor: *Dr. T. Kolev* Lawrence Livermore National Laboratory –*Help design and implement the adaptive mesh refinement module in the* **MFEM** *library.* |

## Grant and Scholarship

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| **Travel Grant for International Conference on Current Trends...** | Jul 2017 |
| **Travel Grant for Joint Mathematics Meeting** | Jan 2017 |
| **Purdue Research Foundation (PRF) Research Grant** | Jun 2015–May 2016 |
| **Finite Element Circus Travel Grant** | Apr 2016 |
| **SIAM CSE15 Travel Grant** | Mar 2015 |
| **Purdue Graduate School Summer Research Grant** | May 2014–Aug 2014 |
| **Purdue Graduate School Summer Research Grant** | May 2013–Aug 2013 |
| **T.T. Moh Graduate Scholarship Fund** | Aug 2010 |

## Publications

1. Z. Cai, C. He, and S. Zhang, *Residual-based a posteriori error estimate for interface problems: nonconforming linear elements,* Math. Comp., 86(2017), 617-636.

2. Z. Cai, C. He, and S. Zhang, *Discontinuous finite element methods for interface problems: robust a priori and a posteriori error estimates*, SIAM J. Numer. Anal., 55(2017), 400-418.

3. Z. Cai, C. He, and S. Zhang, *Improved ZZ a posteriori error estimators for diffusion problems: conforming linear elements*, Comput. Methods Appl. Mech. Engrg., 313(2017), 433-449.

4. Z. Cai, C. He, G. Starke, and S. Zhang, *Robust equilibrated error estimation for nonconforming finite element methods of odd orders*, submitted.

5. C. He and X. Zhang, *Residual based a posteriori error estimations for immersed finite element methods*, resubmitted.

6. E. Burman and C. He, *Primal dual mixed finite element method for advection–diffusion problem*, resubmitted.

7. Z. Cai, C. He, and S. Zhang, *Improved ZZ a posteriori error estimators for diffusion problems: nonconforming and DG linear elements,*, submitted.

8. E. Burman, C. He, and M. Larson, *A posteriori error estimates for cut finite element method with boundary value correction*, submitted.

9. E. Burman, C. He, and M. Larson, *A new shape optimization method for ill-posed free boundary Bernoulli method using CutFEM method*, in preparation.

10. C. He and G. Li, *Unfitted Multi-Scale method using CutFEM method*, in preparation.

## Programming Skills

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| Programming Language: | C/C++, Python, Matlab |
| Finite Element Package: | MFEM, FEniCS |
| Finite Element Visualization: | GLVis, ParaView |
| Statistic Software: | SARS (Base Certificate) |
| High Performance Computing: | OpenMP, MPI, MKL |

## Talks and Posters

- *A Posteriori Error Estimation for CutFEM with Boundary Correction*, **SIAM CSE19**, Spokane, WA, (Feb 2019).

- *A Posteriori Error Estimation for CutFEM with Boundary Correction*, **Computational Methods for Interface Problems Workshop**, UCL, London, UK (Jan 2019).

- **(Invited)** *Robust A Posterior Error Estimations for Nonconforming Finite Element Methods on Interface Problems*, **MSU CAM Seminar**, Mississippi State, MS (Aug 2017).

- *Robust equilibrated error estimator for diffusion problems: nonconforming elements of odd order* (Poster), **International Conference on Current Trends and Challenges in Numerical Solution of Partial Differential Equations**, West Lafatette, IN (Jul 2017).

- *Robust A Posteriori Error Estimation for NC FEM without QMA*, **Purdue SIAM CSESC**, West Lafayette, IN (Apr 2017).

- *Equilibrated a posteriori error estimation for nonconforming FEM of odd orders*, **Finite Element Circus**, New Brunswick, NJ (Apr 2017).

- **(Invited)** *Improved ZZ robust a posteriori error estimation for diffusion problem for conforming FEM*, **SIAM Conference on Computational Science & Engineering (CSE17)**, Atlanta, GA (Mar 2017).

- **(Invited)** *Improved ZZ a Posteriori error estimation for diffusion problem*, **2$^{nd}$ Annual Meeting of SIAM Central States Section**, Little Rock, AR (Oct 2016).

- **(Invited)** *Robust residual based a posteriori error estimation without QMA*, 2nd **Annual Meeting of SIAM Central States Section**, Little Rock, AR (Sep 2016).

- *MFEM: A posteriori error estimation for arbitrary order FEM* (poster), **Summer Student Poster Symposium**, LLNL, CA (Aug 2016).

- *Robust residual based a posteriori error estimation for nonconforming FEM without QMA*, **Finite Element Circus**, College Park, MD (Apr 2016).

- *"A brief picture: Robust a posteriori error estimation for nonconforming finite element methods"*, **Purdue Math Graduate Research Day**, IN (Nov 2015).

- *Inverse heat problem: mapping of coarse temperatures from coarser to finer grid using temporal derivatives*, **IMA Math Modeling in Industry XIX, University of Minnesota**, Twin Cities, MN (Aug 2015).

- **(Invited)** *A posteriori error estimation for nonconforming finite element methods*, **1st Annual Meeting of SIAM Central States Section**, Rolla, MO (Apr 2015).

- **(Invited)** *Residual based a posteriori error estimation for nonconforming finite element methods*, **SIAM CSE15**, Salt Lake City, UT (Mar 2015).

- *A brief picture: A posteriori error estimation for nonconforming finite element methods*, **Purdue Math Graduate Research Day**, IN (Nov 2014).

## TEACHING

**At University College London**

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|---|---|---|
| Fall 2017 | Instructor | MA6202 (Mathematics for Physics and Astronomy) |

**At Purdue University**

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| Spring 2017 | Instructor | MA158 (Pre-Calculus) |
| Fall 2014 | Grader | MA 527 (Advanced Math for Engineer and Physics I) |
| Spring 2014 | Grader | MA 528 (Advanced Math for Engineer and Physics II) |
| Fall 2013 | Recitation | MA 261 (Multivariate Calculus) |
| Spring 2013 | Grader | MA 615 (Numerical PDEs) |
| Fall 2012 | Recitation | MA 162 (Calculus II) |
| Summer 2012 | Grader | MA 303 (ODEs and PDEs) |
| Spring 2012 | Recitation | MA 174 (Multivariable Calculus) |
| Fall 2011 | Recitation | MA 181 (Honors Calculus I) |

## PROFESSIONAL SERVICES

- Organizer of MS "Finite Element Methods on Unfitted Meshes", SIAM Conference on Computational Sciences and Engineering, Spokane, Feb 25–Mar 1, 2019.

- Co-organizer of MS "A Posteriori Error Estimation for Various Finite Element Methods", SIAM Conference on Computational Sciences and Engineering, Spokane, Feb 25–Mar 1, 2019.

- Co-organizer of "Computational Methods for Interface Problems Workshop", University College London, London, UK, Jan 3-4 2019.

- Ph.D. student interview committee, Department of Mathematics, University College London, 2019.

- Co-organizer of "Women in Mathematical Sciences Lunch", Department of Mathematics, University College London, Jul 17, 2018.

- Ph.D. student interview committee, Department of Mathematics, University College London, 2018.