

# Cong Gu

## Curriculum Vitæ

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## Education

### Texas A&M University

Ph.D. in Mathematics, GPA:4.0

Adviser: Goong Chen.

Dissertation: Computational Mechanics for Aircraft Water Entry and Wind Energy

College Station, Texas

Sep. 2011–Dec. 2015

### Shanghai Jiao Tong University

B.S. in Mathematics and Applied Mathematics, GPA:86/100

Honor Class

Shanghai, China

Sep. 2006–Jun. 2010

## Research Experience

### Texas A&M University

Graduate Research Assistant

College Station, Texas

Jun. 2012–Dec. 2015

- Develop CFD codes in C++ based on OpenFOAM technology to study real world problems.
  - studied dynamic turbine-turbine, turbine-tower interaction in wind farms using blade-resolving CFD;
  - studied water landing/crashing of aircrafts, which involves two-phase flow simulations and fluid structure interaction;
  - studied the performance of blended wing body passenger aircrafts compared with conventional ones.
- Construct and analyze numerical schemes for solution of PDEs.
  - studied numerical solution of nonlinear/generalized Schrödinger equations.

### Shanghai Jiao Tong University

Undergraduate Researcher

Shanghai, China

Sep. 2008–Jun. 2010

- Study collective behavior in multi-agent systems over dynamic networks.
  - developed a high performance multi-robot collaboration algorithm for maze exploration;
  - studied effects of an agent-based information exchange system on stock market behavior.

## Vocational Experience

### Shanghai Union Exhibition Co., Ltd.

Project Software Developer

Shanghai, China

Oct. 2010–Aug. 2011

- Develop software to control a robot that can play Chess.
  - developed computer vision applications with OpenCV;
  - developed software and drivers for embedded Linux controllers;
  - developed and adapted Chess and Xiangqi (Chinese Chess) engines.

## Teaching Experience

### Texas A&M University

Graduate Teaching Assistant

College Station, Texas

Sep. 2011–May. 2015

- Serve as grader, recitation host, lab instructor for various levels of engineering mathematics:
  - Methods of Applied Mathematics I (graduate level). Fall 2011.
  - Engineering Mathematics I (undergraduate level calculus I). Spring, Summer, Fall 2012.
  - Engineering Mathematics II (undergraduate level calculus II). Spring 2013, Spring 2015.

## Skills and Expertise

**OpenFOAM Technology:** very familiar with OpenFOAM code structures, with many experiences in writing solvers, extension libraries and computation cases for OpenFOAM.

**Theoretical and Numerical Analysis of PDEs:** trained in a renowned math Ph.D. program for

theoretical and numerical analysis of PDEs, especially Navier-Stokes equations.

**Computer Programming:** involved in many programming projects over the years. Proficient in C/C++, lisp/scheme, MATLAB/octave, bash. Hand-on experience with Python, Mathematica, R, etc, and many scientific libraries.

**Linux:** seasoned Linux user, developer and system maintainer.

**HPC:** all recent CFD projects are executed on HPC.

## Publications

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### Journal.....

- [1] Goong Chen, Cong Gu, Philip J Morris, Eric G Paterson, et al. "Malaysia Airlines Flight MH370: Water Entry of an Airliner". In: *Notices of the American Mathematical Society* 62.4 (2015), pp. 330–334.

### Dissertation.....

- [1] Cong Gu. "Computational Mechanics for Aircraft Water Entry and Wind Energy". Texas A&M University, 2015.

### Preprint / in Preparation.....

- [1] Goong Chen, Cong Gu, Hichem Hajaiej, Philip J Morris, et al. "OpenFOAM computation of interacting wind turbine flows and control". URL: <https://www.dropbox.com/s/9iiu9yh1jpvpmz5/7.pdf?dl=1>.
- [2] Cong Gu. "Structural failure of aircraft during water entry". URL: <https://www.dropbox.com/s/wo97hglux6bdu2o/22.pdf?dl=1>.
- [3] Cong Gu and Goong Chen. "Numerical Solution for Nonlinear Schrödinger Equations using OpenFOAM".
- [4] Cong Gu and Goong Chen. "Aerodynamics and Performance of Blended-Wing-Body Aircrafts".
- [5] Goong Chen, Alain Perronnet, Wang Yi-Ching, and Cong Gu. "Finite Element Analysis for Land Crash of Airliner".

## Talks, Conferences and Workshops

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### Talks Given.....

- Thirty minute talk at booth. The International Conference for High Performance Computing, Networking, Storage and Analysis 2015 (SC15), Austin, Texas. Nov. 15–20, 2015.
- Thirty minute talk. Texas Partial Differential Equations Conference 2015, Houston, Texas. Mar. 28–29, 2015.
- Thirty minute talk. AMS Special Session on Recent Advances in the Analysis and Applications of Modern Splitting Methods, Joint Mathematics meeting 2015 (JMM15), San Antonio, Texas. Jan. 10–13, 2015.
- One hour talk. NYU-ECNU Institute of Mathematical Sciences, NYU Shanghai, Shanghai, China. Dec. 12, 2014.

### Attended.....

- Summer Graduate School — Incompressible Fluid Flows at High Reynolds Number. Mathematical Sciences Research Institute (MSRI), Berkeley, California. Jul. 27–Aug. 7 2015.

### Research Visits.....

- Science Program, Texas A&M University at Qatar, Qatar. Jan. 11 – May. 5, 2013
- NYU-ECNU Institute of Mathematical Sciences, NYU Shanghai, Shanghai, China. Dec. 11–31, 2014

## Languages

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**English:** Proficient

**Mandarin Chinese:** Native