# Yaning Liu

**Postdoctoral Fellow**
Earth Sciences Division, Lawrence Berkeley National Laboratory
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| **EDUCATION** | *Ph.D.*, Applied and Computational Mathematics, | Fall 2013 |

Florida State University, Tallahassee, FL, 32306
Advisor: Dr. M. Yousuff Hussaini
Co-advisor: Dr. Giray Ökten
Thesis title: Non-intrusive Methods for Probabilistic Uncertainty Quantification and Global Sensitivity Analysis in Nonlinear Stochastic Phenomena

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| | *M.S.*, Applied and Computational Mathematics, | Aug. 2011 |

Florida State University, Tallahassee, FL, 32306
Advisor: Dr. M. Yousuff Hussaini

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| | *B.S.*, Information and Computational Science, | Jul. 2006 |

Zhejiang University, Hangzhou, Zhejiang, China
Advisor: Dr. Xiaoliang Cheng
Thesis title: A Six-Order Finite-Difference Method for Nonlinear Second-Order Two-Point Boundary-Value Problems
Minor: English

**RESEARCH INTERESTS**

Uncertainty quantification and sensitivity analysis
Reduced order modeling
Machine learning
Geostatistics
Numerical methods for stochastic computations
Monte Carlo methods and randomized quasi-Monte Carlo methods
High dimensional model representation
High order (spectral) methods for partial differential equations
Financial mathematics and weather derivatives
Biomathematics

**COURSES TAKEN**

Mathematical Analysis, Advanced Algebra, Numerical Approximation, Numerical Linear Algebra, Partial Differential Equations, Numerical Solution of Differential Equations, Fluid Dynamics, Computational Fluid Dynamics, Foundations of Computational Mathematics, Methods of Applied Mathematics, Monte Carlo Methods, Computational Methods in Statistics, Spectral Methods for Partial Differential Equations, Machine Learning, Introduction to Financial Mathematics, Financial Engineering.

**EXPERIENCE**

*Research Experience*

- Postdoctoral Fellow        January 2014-Present
  Lawrence Berkeley National Laboratory, Berkeley, CA
- Research Assistant        Summer 2012-Summer 2013
  Department of Mathematics, FSU

- Research Assistant        Summer 2011
  Department of Mathematics, FSU
- Research Assistant        Summer 2010
  Center for Advanced Power Systems (CAPS), FSU

*Teaching Experience*

- Solo instructor        Fall 2013
  Calculus 1
- Solo instructor        Spring 2012
  Calculus 1
- Managing proctor        Fall 2011
  All basic mathematics courses
- Solo instructor        Spring 2011
  Precalculus
- Solo instructor        Fall 2010
  Precalculus
- Teaching assistant        Fall 2008 - Spring 2010
  College Algebra, Calculus for Business, Liberal Arts Math, Practical Finite
  Mathematics,

## PAPERS

### In Refereed Journals

- **Y. Liu**, M.Y. Hussaini, and G. Ökten, "Optimization of a Monte Carlo Variance Reduction Method Based on Sensitivity Derivatives", *Applied Numerical Mathematics*, **72**, 160-171, 2013. URL: [http://www.sciencedirect.com/science/article/pii/S0168927413000871](http://www.sciencedirect.com/science/article/pii/S0168927413000871).

- E. Jiménez, **Y. Liu** and M.Y. Hussaini, "Variance reduction method based on sensitivity derivatives, Part 2", *Applied Numerical Mathematics*, **74**, 151-159, 2013. URL: [http://www.sciencedirect.com/science/article/pii/S0168927412001778](http://www.sciencedirect.com/science/article/pii/S0168927412001778).

- **Y. Liu**, E. Jiménez, M.Y. Hussaini, G. Ökten, and Scott Goodrick, "Parametric uncertainty quantification in the Rothermel model with randomized quasi-Monte Carlo methods", *International Journal of Wildland Fire*, to appear.

- J. Angela, **Y. Liu**, N. Cogan, and M.Y. Hussaini, "Global sensitivity analysis used to interpret biological experimental results", *Journal of Mathematical Biology*, in press.

### In Refereed Conference Proceedings

- **Y. Liu**, M.Y. Hussaini, and G. Ökten, "Global sensitivity analysis for the Rothermel model based on high dimensional model representation", *4th Fire Behavior and Fuels Conference Proceedings*, 2013.

- A. Göncü, **Y. Liu**, G. Ökten and M.Y. Hussaini, "Global sensitivity analysis in weather derivatives pricing", *Eleventh International Conference on Monte Carlo and Quasi-Monte Carlo Methods in Scientific Computing, KU Leuven, Belgium*, April 8 - 11, 2014.

### In Preparation

- **Y. Liu**, M.Y. Hussaini, and G. Ökten, "On the accurate construction of Cut-HDMR".
- E. Jiménez, A. Uzun, **Y. Liu** and M.Y. Hussaini, "Uncertainty quantication of the aeroacoustic response of an airfoil under a stochastic gust".

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| **TALKS & PRESENTATIONS** | *Conferences & Workshops* |

- "Quantifying parametric uncertainty in the Rothermel model with efficient sampling methods", 4th Fire Behavior and Fuels Conference, Raleigh, NC, Feb. 2013. (presentation)
- "Optimization of a Monte Carlo Variance Reduction Method Based on Sensitivity Derivatives", Joint Math Meeting, San Diego, California, Jan. 2013. (presentation)
- "Parametric Uncertainty Quantification in the Rothermel Model with Randomized Quasi-Monte Carlo Methods", Workshop on Advances in Computational Mathematics and Engineering, Sep. 2012. (poster)
- Kick-Off Meeting for Mathematical and Statistical Methodologies for DOE Data-Centric Science at Scale Lawrence Berkeley National Laboratory, Lawrence Berkeley National Laboratory, Berkeley, California, Mar. 2014. (attendance)
- "Reduced-order modeling of fine-resolution hydrologic simulations at NGEE-Arctic study sites", Complex Soil Systems Conference, Berkeley, California, Sep. 2014. (poster)

*Seminars*
- "Multilevel Monte Carlo Methods", Monte Carlo Methods Seminar, Department of Mathematics, Florida State University, Tallahassee, FL, Mar. 2013.
- "Parametric Uncertainty Quantification in the Rothermel Model with Randomized Quasi-Monte Carlo Methods", Monte Carlo Methods Seminar, Department of Mathematics, Florida State University, Tallahassee, FL, Oct. 2012.
- "Global Sensitivity Analysis", Monte Carlo Methods Seminar, Department of Mathematics, Florida State University, Tallahassee, FL, Jan. 2012.

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| **REVIEW FOR JOURNALS** | International Journal of Wildland Fire, Environmental Modelling and Software |

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| **SKILLS** | *Programming Languages & Software:* |

- Fortran90, C, C++, Matlab, Python, R, Octave, Bash shell, Pascal
- Latex, Microsoft Word, Open Office
- DAKOTA, BehavePlus, FARSITE

*Operating Systems:*
Macintosh, various distributions of Linux/Unix, Windows

*Languages:*
English, Chinese (native), German (Certificate of College German Test-Band 4)

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| **HONORS & AWARDS** | |

- Award of "Distinguished Teaching Assistant", Department of Mathematics, FSU, Mar. 2013.
- American Mathematical Society Grad Student Travel Grant, Jan. 2013.
- Third Prize Poster Award in Workshop on Advances in Computational Mathematics and Engineering, Sep. 2012.

**PROFESSIONAL MEMBERSHIP**

- American Mathematical Society (AMS)
- Society for Industrial and Applied Mathematics (SIAM)
- Pi Mu Epsilon
- International Association of Wildland Fire (IAWF)
- American Geophysical Union (AGU)

**References**

Prof. M. Yousuff Hussaini
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Prof. Giray Ökten
Department of Mathematics
Florida State University
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☎ 850-644-8713
✉ okten@math.fsu.edu

Prof. Anuj Srivastava
Department of Statistics
Florida State University
Tallahassee, FL 32306-4330
☎ 850-644-8832
✉ anuj@stat.fsu.edu

Dr. George Shu Heng Pau
Earth Sciences Division
Lawrence Berkeley National Laboratory
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✉ gpau@lbl.gov