

# Arun Kumar

**Current Position:** Postdoctoral Fellow, Department of Biostatistics and Computational Biology, School of Medicine and Dentistry, University of Rochester.

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Address:  
601 Elmwood Avenue, Box 630,  
Rochester, New York-14642

Phone: (585) 241-0727  
Email: arun\_kumar@urmc.rochester.edu  
Citizenship: Indian, Visa Status: H-1B

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## Education

- **Ph.D. (Statistics):**  
**The Ohio State University** (2004-2008), Columbus, Ohio, USA.  
Thesis Topic: “Sequential Calibration of Computer Models”  
Adviser: Dr. William Notz
- **M.Sc. (Mathematics and Computing):**  
**Indian Institute of Technology** (2000-2002), Kharagpur, India.  
Thesis Topic: “Prediction of Dynamic Multimedia Traffic”
- **B.Sc. (Mathematics and Computing):**  
**Indian Institute of Technology** (1997-2000), Kharagpur, India.  
Thesis Topic: “System of Linear Equations with Generalized Matrix Coefficients”

## Research Interest

- **Ordinary Differential Equation (ODE) Modeling:** I am interested in developing efficient but computationally cheap statistical methods for estimating parameters of ODE models. In addition to parameter estimation, developing finite-sample statistical inference methods for ODE models will be primary focus of my research.
- **Computer Experiments:** Computer experiments are becoming a popular mode of data collection replacing costly physical experiments. In computer experiments, complex mathematical models, surrogates for real phenomena under investigation, are solved numerically using computer codes. I am interested in the problem of calibration of computer experiments and in related design issues. I will also explore the possibility of applying the methods in the computer experiment literature to problems in ODE modeling.

## Publications

- Wu, H., Xue, H., and Kumar, A. (2009). “Numerical Algorithm-Based Estimation Methods for ODE Models via Penalized Spline Smoothing” submitted to *The Annals of Statistics*.
- Wu, H., Xue, H., and Kumar, A. “Adaptive Numerical Algorithm-Based Estimation Methods for ODE Models” to be submitted to *Biometrika*.
- Kumar, A. and Notz, W. “Sequential Calibration of Computer Models” to be submitted to *Journal of Statistical Planning and Inference*.

## Papers in Preparation and Technical Reports

- Kumar, A. and Notz, W. (2008). “Sequential Calibration of Computer Models” Technical Report No. 823, Department of Statistics, The Ohio State University.
- Wu, H., Kumar, A., and Xue, H. “Parameter Estimation Methods for ODE Models: A Comparative Study” in preparation.

## Teaching and Leadership

Teaching Associate for the Department of Statistics, The Ohio State University. Course taught “Statistics for the Business Sciences”.

- Course Coordinator and Lecturer, Summer 2006. Full responsibility for the course (60 students enrolled) including writing syllabus, preparing course schedule, exams, homeworks, and directing grader for the course.
- Lecturer, 2006-2007. Assisted course coordinator Dr. Deborah Rumsey in the redesign of course materials to make it more interesting. Lectured the night section (60-80 students per quarter) and coordinated the night section with the day section.
- Recitation Instructor, 2004-2006. Led groups of 30 students through recitation activities, reviewed course content, summarized important statistical concepts, and answered students’ questions.

## Research and Professional Experience

### • Academic

- Postdoctoral Fellow in the Department of Biostatistics and Computational Biology, University of Rochester, August 2008 until now.
  - \* Developed an ODE model to describe proliferation and migration of CD8 T cells in response to a flu infection in lymph node, spleen, and lung. This model development required skills to do identifiability analysis, parameters estimation, statistical inference, and model selection for an ODE model. The NIH is funding the project.
- Research Associate for the Department of Statistics, The Ohio State University, Summer 2005.
  - \* Assisted in the organization and development of “Quick and Easy”; a teaching resource for introductory statistics courses.

### • Industrial

- Software Engineer for Persistent Systems Ltd., Pune, India (July 2002-Oct 2003).

## Conferences and Invited Talks

- Invited talk “Sequential Design for Calibration of Computer Models”, DEMA Conference, **Sir Isaac Newton Institute of Mathematics**, Cambridge, England (Aug 2008).
- Contributed paper presentation “Numerical Algorithm-Based Estimation Methods for ODE Models”, JSM, Washington DC, USA (Aug 2009).

- Contributed paper presentation “Sequential Design for Calibration of Computer Models”, JSM, Denver, Colorado, USA (Aug 2008).
- Poster presentation “Sequential Design for Calibration of Computer Models”, Design and Analysis of Experiment Conference, The University of Memphis, Memphis, TN (Oct-Nov 2007).
- Guest lecture on “NP-complete problems” at Maharashtra Institute of Technology, Pune, India (Feb 2003).

### Computing Skills

- Excellent programming skills in C/C++ and R. Proficient in Latex.
- Familiar with MATLAB, MINITAB, JMP, SAS, and SPSS.
- Operating systems: Windows, Unix, and Linux.

### References

- Dr. William Notz  
Affiliation: Department of Statistics, The Ohio State University  
e-mail: win@stat.osu.edu  
phone: 614-292-3154
- Dr. Thomas Santner  
Affiliation: Department of Statistics, The Ohio State University  
e-mail: tjs@stat.osu.edu  
phone: 614-292-3593
- Dr. Deborah Rumsey  
Affiliation: Department of Statistics, The Ohio State University  
e-mail: rumsey@stat.osu.edu  
phone: 614-292-0779
- Dr. Hulin Wu  
Affiliation: Department of Biostatistics and Computational Biology, University of Rochester  
e-mail: hwu@bst.rochester.edu  
phone: 585-241-0705