

# CURRICULUM VITAE

## Andrea Brose

### Personal History

**Born** 2. February 1968, Berlin Dahlem, Germany  
**Citizenship** Germany  
**Family** Married (Bjorn Stevens); two children, Saskia (1997), Anouk (1999)

### Education

**Ph.D.** Mathematics, 1993-1998, University of Colorado, Boulder, CO, USA  
Dissertation: "A Stochastic Model Describing Collision And Coalescence of Cloud Drops in a Gravitational Field"  
Adviser: Richard Holley  
**Vordiplom** Mathematics, Physics minor, 1990, Freie Universität Berlin, Berlin, Germany  
**Abitur** Mathematics and Physics major, 1987, Beethoven Gymnasium, Berlin, Germany

### Professional Experience

#### **Hamburg University of Technology, 2009–**

RESEARCH ASSISTANT: Participation in Project *Active Learning in Engineering Education*

#### **Department of Mathematics, University of California Los Angeles, 1999– 2010**

ACADEMIC ADMINISTRATOR: Academic administration and undergraduate instruction, since 2007

LECTURER: Undergraduate instruction, with increasing responsibilities for academic administration (supervision/training of teaching assistants, curriculum development, academic policy), 2002–2007

VISITING ASSISTANT PROFESSOR: Undergraduate instruction, 1999–2002

#### **Department of Mathematics, University of Colorado Boulder, 1993–1998**

TEACHING ASSISTANT: Assistant to undergraduate instruction

INSTRUCTOR: Undergraduate instruction

#### **Department of Mathematics, Freie Universität Berlin, 1990–1993**

TEACHING ASSISTANT: Assistant to instruction

INSTRUCTOR: Instruction of summer workshops

## **Professional Interests**

- Probability and Stochastic Processes
- Set theory
- Math Education
- Engineering Education

## **Refereed Publications**

1. Brose, Andrea and Christian Kautz, 2010: Research on student understanding as a guide for the development of instructional materials in introductory engineering courses. Proceedings, 3rd International Symposium for Engineering Education, 2010, Cork, Ireland, July 1-2.

## **Academic Awards and Fellowships**

- Best Paper Award - Runner Up at the 3rd International Symposium for Engineering Education (2010)
- Robert Sorgenfrey Distinguished Teaching Award (2008)
- Academic Advancement Program Faculty Recognition Award (2006)
- University Fellowship (1997)
- Protected Class Fellowship (1996)
- Graduate School Dean's Small Grant Award (1995)
- Research Fellowship (1994)
- University Fellowship (1993)

## **Invited Talks, Professional Meetings**

- „Lehre Neu Denken“, Berlin (2010)
- 14. Workshop „ Herausforderung: Übergang Schule – Hochschule“, Ilmenau (2010)
- Workshop Problem Based Learning", Hamburg (2010)
- 3rd International Symposium for Engineering Education, Cork, Ireland July 2010
- Mathematical Education of Engineers, 15th Seminar SEFI Math Working Group, Wismar, Germany June 2010

- *Fachbezogene und fachübergreifende Hochschuldidaktik – voneinander lernen*, Dortmund Spring School for Academic Staff Developers, Dortmund, Germany, March 2010
- *Qualitätsdialog - Lehre und Lernen in der Ingenieurausbildung*, Bonn, Germany, September 2009
- *Active Learning in Engineering Education*, Barcelona, Spain, June 2009
- *A Stochastic Model Describing Collision And Coalescence of Cloud Drops in a Gravitational Field*, UCSD, San Diego, USA, February 2000
- *Bumping, Bouncing, Sticking: The Mathematics of Rain*, UCLA, Los Angeles, USA, March 2000
- Southern California Probability Symposium (annually since 1999)

## Graduate Instruction

**Teaching College Mathematics:** Seminar, one hour and two-day intensive training at the beginning of Fall Quarter. Required of all new teaching assistants and new Ph.D. students. Special course designed to deal with problems and techniques of teaching college mathematics.

## Advanced Undergraduate Instruction

**Analysis:** Rigorous introduction to foundations of real analysis; real numbers, point set topology in Euclidean space, functions, continuity.

**Linear Algebra:** Techniques of proof, abstract vector spaces, linear transformations, and matrices; determinants; inner product spaces; eigenvector theory.

**Optimization:** Fundamentals of optimization. Linear programming: basic solutions, simplex method, duality theory. Unconstrained optimization, Newton's method for minimization. Nonlinear programming, optimality conditions for constrained problems. Additional topics from linear and nonlinear programming.

**Mathematical Game Theory:** Quantitative modeling of strategic interaction. Topics include extensive and normal form games, background probability, lotteries, mixed strategies, pure and mixed Nash equilibria and refinements, bargaining; Optional topics include repeated games and evolutionary game theory.

**Probability Theory:** Probability distributions, random variables and vectors, expectation, convergence in distribution, normal approximation, laws of large numbers, Poisson processes, random walks.

## Beginning Undergraduate Instruction

**Physical Science Calculus Sequence:** Four quarter (40 week) sequence focusing on: differential calculus and applications; introduction to integration; transcendental functions; methods and applications of integration; sequences and series; introduction to differential calculus of several variables, vector field theory; integral calculus of several variables, line and surface integrals.

***Calculus and Probability for Life Science Students:*** Three quarter sequence focusing on: Techniques and applications of differential and integral calculus of a single variable; introduction to differential equations and multi-variable differential calculus. Introduction to probability: random variables; distributions; limit theorems.

***Precalculus:*** Introduction to quantitative reasoning; function concept; linear and polynomial functions and their graphs; applications to optimization; inverse, exponential, and logarithmic functions; trigonometric functions. Introduction to finite mathematics (Matrices, Gauss-Jordan method, combinatorics, probability, Bayes' theorem, and Markov chains).

## **Curriculum Development**

- Selected text and developed (and currently maintain) curriculum for the Calculus and Probability for Life Science Students course sequence.
- Wrote resp. am writing script for advanced undergraduate optimization, and lecture notes for game theory course.
- Reviewer of textbooks for J.Wiley and Prentice Hall. My contributions are acknowledged in several leading text books, including Marsden and Tromba's *Vector Calculus*, and Neuhauser's *Calculus for Biology and Medicine*.
- Textbook selection committees, at times chair thereof.
- Responsible for collecting and synthesizing instructors' ideas for curriculum development and adjustment.
- Helped design inter-departmental program in Mathematics and Atmospheric and Oceanic Sciences.

## **Other Academic Administration**

- Undergraduate studies committee.
- Responsible for training and administration of the department's Graduate Teaching Assistants (more than one hundred).
- Responsible for training Teaching Fellows to teach their own undergraduate course, and instructor in charge thereof.
- New faculty orientation and faculty instructional resource.
- Development and maintenance of teaching manuals for teaching assistants, teaching fellows and faculty.
- Maintenance of departmental webpages regarding resources related to teaching.

- Monitoring and processing of academic integrity violations .
- Oversight of the Student Math Center (group study and tutorials for lower division mathematics courses).
- Responsible for writing grant proposals and securing university funding for teaching assistant training programs and other aspects of instructional development.
- Responsible for following broader developments in undergraduate education and introducing them (when appropriate) into teacher education workshops.

## **Languages**

*German:* native

*English:* fluent

*French:* basic level