

EDWARD CASTILLO

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EDUCATION

- 2001–present: *Rice University, Department of Computational and Applied Mathematics (CAAM)*
Graduate Student, Ph. D. Program. Advisor: Yin Zhang.
Expected date of graduation: May 2007.
- 1997–2001: *St Mary's University, San Antonio, TX*
Bachelor of Science.
Major: Mathematics. Minor: Computer Science.
- 1993–1997: *Antonian College Preparatory High School, San Antonio, TX*

RESEARCH

The theoretical development and numerical implementation of image registration methods for high resolution images. These types of image registration problems involve modeling of pixel motion, least-squares finite element solutions to optical flow formulations, iterative solutions to large scale linear systems, large scale nonlinear optimization, and parallel computing.

Research projects include: (1) Developing compressible flow registration methods for images where pixel intensities are modeled by the conservation of mass equation. (2) Development of an efficient, parallelizable image registration algorithm suitable for 4D computed tomography images of human lungs which is robust to noise and accounts for the compressible nature of lung tissue. (3) Extension of differential equation based image registration methods for images with large pixel displacements, such as breathhold lung CT images. (4) Dynamic ventilation imaging from 4D computed tomography via image registration.

ACADEMIC AWARDS AND SCHOLARSHIPS

- 2001: St. Mary's University Honor's Program Graduate

TEACHING EXPERIENCE

- Jan.–May 2006: *CAAM Department, Rice University*
Instructor for the course CAAM 210, Introduction to Engineering Computation. Modeling, Simulation and Visualization via Matlab
- Aug.–Dec. 2003: *CAAM Department, Rice University*
Teaching assistant for the course CAAM 210, Introduction to Engineering Computation. Modeling, Simulation and Visualization via Matlab
- Aug.–Dec. 2002: *CAAM Department, Rice University*
Teaching assistant for the course CAAM 210, Introduction to Engineering Computation. Modeling, Simulation and Visualization via Matlab

PUBLICATIONS

- Thomas Guerrero, Kevin Sanders, Edward Castillo, Yin Zhang, Luc Bidaut, Tinsu Pan, and Ritsuko Komaki. Dynamic ventilation imaging from four-dimensional computed tomography. *Physics in Medicine and Biology*, 51:1–15, 2006.
- T.M. Guerrero, K. Sanders, J. Noyola-Martinez, E. Castillo, Y. Zhang, R. Tapia, R. Guerra, Y. Borghero, and R. Komaki. Quantification of regional ventilation from treatment planning ct. *Int J Radiat Oncol Biol Phys*, 2005.

PRESENTATIONS

- Institute for Mathematics and its Applications Special Workshop: Blackwell-Tapia Conference, Minneapolis, MN, November 2006: *Registration of 4D CT Lung Images*.
- SIAM Annual Meeting, Boston, MA, July 2006: *Towards an Effective Image Registration Method for 4D CT Images*.
- INFORMS Optimization Society Conference on Optimization and Health Care, San Antonio, TX, Feb. 2006: *Towards an Effective Image Registration Method for 4D CT Images*.
- Master's Thesis Defense, CAAM Dept., Rice University, Houston, TX, Oct. 2005: *Medical Image Registration: A Review of Existing Methods and Preliminary Numerical Results*.
- CAAM Lunch Talk, CAAM Dept., Rice University, Houston, TX, Dec. 2004: *4D CT Lung Images: I Don't Know What to Do With Them*.

COMPUTER SKILLS

Programming: C/C++, Matlab.
OS: Unix, Linux, Windows.
Miscellaneous: Latex, HTML.