

Guillem Pratx

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Education

B.S. Engineering, École Centrale Paris, France, 2004.

M.S. Electrical Engineering, Stanford University, CA, 2006.

Ph.D. Electrical Engineering, Stanford University, CA, *expected* 2009.

Thesis: “Practical iterative reconstruction for high-resolution positron emission tomography”

Adviser: Craig S. Levin, Ph.D.

Research Experience

2005–present, Molecular Imaging Program, Stanford University, CA

Doctoral Student. Researched and implemented novel image reconstruction solutions for positron emission tomography (PET) systems. Designed a framework for performing fast line projections with shift-varying kernels on PC graphics hardware, in order to accelerate image reconstruction. Applied method successfully to commercially-available high-resolution and time-of-flight PET systems. Developed a Bayesian estimation method to improve positioning of high-energy photons in small PET detectors.

2007–present, Cancer Center, Stanford University, CA

Research Assistant. Implemented software package for calibration and real-time operation of a surgical gamma camera prototype. Helped conduct clinical study of gamma camera for guiding sentinel lymph node biopsy in breast cancer and melanoma (40 patients).

Summer 2007, University of Manchester, UK

Visiting Researcher. Investigated novel non-linear optimization methods for maximum-likelihood PET image reconstruction based on the conjugate gradient method.

Summer 2004, LIAMA, Chinese Academy of Sciences, Beijing, China

Research Intern. Designed and implemented methods to automatically extract buildings from high-resolution satellite images.

Honors & Awards

Fellowships

Bradley-Alavi Fellow, Society of Nuclear Medicine, 2006.

Bio-X Fellowship, Stanford University, 2006.

NVIDIA Fellowship, 2006.

Awards

Top Student Paper Award, IEEE Medical Imaging Conference, Dresden, Germany, 2008

IEEE Travel Award to attend IEEE Medical Imaging Conference, Dresden, Germany, 2008.

Society of Nuclear Medicine Travel Award to attend Annual Meeting, New Orleans, LA, 2008

IEEE Travel Award to attend IEEE Medical Imaging Conference, Honolulu, HI, 2007.

Bio-X Travel Grant to attend Fully 3D Meeting in Lindau, Germany, 2007.

Philips Travel Award to attend IEEE Medical Imaging Conference, San Diego, CA, 2006.

Teaching

IEEE Short Course, Honolulu, HI, 2007

Programming and Medical Applications Using Graphics Hardware.

Professional Activities

Service

President, French Stanford Student Association, Stanford University, 2007-2008.

Secretary, French Stanford Student Association, Stanford University, 2006-2007.

Refereeing

IEEE Transactions in Nuclear Science

IEEE Transactions in Medical Imaging

Miscellaneous

Computer Skills

C, C++, OpenGL, CG, CUDA, Linux, Matlab, \LaTeX

Optimization (linear & non-linear)

Statistical signal processing, estimation, Monte-Carlo simulation

Image processing, computer vision, computer graphics

Languages

English (fluent), French (fluent), Spanish (basic), Mandarin (basic).

Publications and Conference Presentations

Peer-Reviewed Publications

Pratz G, Chinn G, Olcott PD & Levin CS, “Fast, accurate and shift-varying line projections for iterative reconstruction using the GPU”, *IEEE Trans. Med. Imag.* (in press)

Pratz G & Levin CS, “Robust Bayesian Reconstruction of Photon Interaction Sequences for High-Resolution PET Detectors”, submitted to *Phys. Med. Bio.*

U.S. Patents

Pratz G, Olcott PD & Levin CS, “Method of reconstructing a tomographic image using a graphics processing unit”, US 2007/0201611 A1.

Pratz G & Levin CS, “Method and apparatus for imaging using robust Bayesian sequence reconstruction”, filed.

Invited Talks

Molecular Imaging Program at Stanford (Stanford, CA), September 24, 2007. “Accelerating tomographic image reconstruction for PET using computer graphics hardware”

Service Hospitalier Frédéric Joliot (Orsay, France), September 4, 2007. “Preconditioned conjugate gradient algorithm for ML”.

Manchester Institute for Mathematical Science (Manchester, UK), September 10, 2007. “Ultra-fast tomography using off-the-shelf graphics cards”.

Molecular Imaging Program at Stanford (Stanford, CA), March 27, 2006. “Real-time imaging algorithms for surgical gamma camera”

Conference Presentations

Pratz G, Surti S & Levin CS, “GPU-accelerated list-mode reconstruction for 3-D time-of-flight (TOF) PET”, submitted to *Soc Nucl Med Annual Meeting*, 2009.

Olcott PD, **Pratz G**, Johnson DL, Mansouri MA & Levin CS, “Clinical feasibility of an intra-operative hand-held gamma camera for sentinel lymph node biopsy for the surgical staging of melanoma and breast cancer”, submitted to *Soc Nucl Med Annual Meeting*, 2009.

Pratz G, Chinn G, Olcott PD & Levin CS, “Fast, accurate and shift-varying line projections for iterative reconstruction using the GPU”, *IEEE Medical Imaging Conference*, Dresden, Germany, 2008.

Pratz G, Reader AJ & Levin CS, “Faster maximum-likelihood reconstruction via explicit conjugation of search directions”, *IEEE Medical Imaging Conference*, Dresden, Germany, 2008.

Gu Y, **Pratz G**, Lau FWY & Levin CS, “Effects of photon multiple interactions in a high Resolution PET system That uses 3-D positioning detectors”, *IEEE Medical Imaging Conference*, Dresden, Germany, 2008.

Pratz G & Levin CS, “Maximum a posteriori event positioning in high-resolution PET CZT detectors”, **oral presentation**, *Soc Nucl Med Annual Meeting*, New Orleans, LA, 2008.

Pratz G, Reader AJ & Levin CS, “Fast maximum likelihood image reconstruction via PCG without a line search”, **oral presentation**, *Soc Nucl Med Annual Meeting*, New Orleans, LA, 2008.

Peng H, Olcott PD, **Pratz G**, Foudray AMK, Chinn G & Levin CS, “Design study of a high-resolution breast-dedicated PET system built from CZT detectors”, *IEEE Medical Imaging Conference*, Honolulu, HI, 2007.

Pratz G & Levin CS, “Accurately positioning events in a high-resolution PET system that uses 3D CZT detectors”, **oral presentation**, *IEEE Medical Imaging Conference*, Honolulu, HI, 2007.

Pratz G, Chinn G, Olcott PD & Levin CS, “Fully 3D list-mode OSEM on PC graphics hardware: Quantitative studies”, *IEEE Medical Imaging Conference*, Honolulu, HI, 2007.

Pratz G, Chinn G, Habte F, Olcott PD & Levin CS, “Acceleration of fully 3-D list-mode OSEM with system modeling for high-resolution PET using graphics processing units”, **oral presentation**, *International Meeting on Fully 3-D Image Reconstruction in Rad. and Nuclear Medicine*, Lindau, Germany, 2007.

Pratz G, Chinn G, Habte F, Olcott P & Levin CS, “Fully 3-D list-mode OSEM accelerated by graphics processing units”, *IEEE Medical Imaging Conference*, San Diego, CA, 2006.

Olcott PD, Buss SR, Levin CS, **Pratz G** & Sramek CK, “GRAY: High energy photon ray tracer for PET applications”, *IEEE Medical Imaging Conference*, San Diego, CA, 2006.

Pratz G, Chinn G, Olcott P & Levin CS, “Accelerated list-mode 3D-OSEM reconstruction for PET on a graphics processing unit”, **oral presentation**, *Soc Nucl Med Annual Meeting*, San Diego, CA, 2006.

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