

Date: October 2010

COLLEGE OF ENGINEERING
Faculty Activities Summary

Name: Gary E. Christensen

University No: 00084101

Academic Rank and Date Appointed (Mo/Yr): Associate Professor, July 2003

Date of First University of Iowa Appointment (Mo/Yr): January 1997

Department(s): Electrical and Computer Engineering

Office Address: 4324 S.C. Office Phone: 319-335-6055
Home Address: 1352 Wild Prairie Drive Home Phone: 319-351-7705
Iowa City, IA 52246

Birthplace & Date (Optional): St. Louis, Missouri, 12/24/65

Spouse's Name, if Applicable (Optional): Shannon M. Christensen

Highest Academic Degree: Doctorate of Science

Special Fields of Knowledge: Image Registration, Probability, Stochastic Processes, Image & Signal Processing, Medical Imaging, VLSI Design, Parallel Programming

Present Research Interests: Computational Anatomy, Global Shape Models, Medical Imaging

Present Course Teaching Preferences:

(List courses by course number and title in descending order of teaching preference)

Program Courses (List at least five)

1. 55:146 Digital Signal Processing
2. 55:040 Linear Systems I
3. 55:043 Linear Systems II
4. 55:033 Software Design
5. 55:248 Advanced Digital Image Processing
6. 55:148 Digital Image Processing
6. 55:050 Communication Systems
7. 55:150 Communication Theory

Core Courses (List at least two)

1. 59:006 Engineering Problem Solving 2
2. 57:017 Computers in Engineering
2. 57:008 Electrical Circuits

NOTE: THIS PAGE IS LIMITED TO THE INFORMATION REQUESTED AND THAT
INFORMATION IS LIMITED TO THE SPACE PROVIDED.

The University of Iowa, College of Engineering requests this information on the credentials and accomplishments of faculty for collegiate purposes including consideration for reappointment, promotion, and merit salary adjustments. No persons outside the University are routinely provided this information. Information you fail to provide will result in an incomplete record of your credentials and accomplishments. Responses to items marked "optional" are optional.

1. Academic Background

<u>Institution</u>	<u>Dates Attended</u>	<u>Major</u>	<u>Degree</u>	<u>Date Awarded</u>
Washington Univ.	1984-1988	E.E.	B.S.	1988
Washington Univ.	1984-1988	C.S.	B.S.	1988
Washington Univ.	1988-1989	E.E.	M.S.	1989
Washington Univ.	1990-1994	E.E.	D.Sc.	1994

2. Professional Experience

2.1 Academic

<u>University</u>	<u>Position</u>	<u>Dates</u>	<u>Main Courses Taught</u>
Washington Univ.	Comp. Prog. at the Biomedical Computer Lab.	1987-1988	
Washington Univ.	Res. Asst. under R. Morley	1988-1989	
Washington Univ.	Res. Asst. at the Biomedical Computer Lab.	1990-1991	
Washington Univ.	Res. Asst. under M.I. Miller	1991-1994	
Washington Univ.	Res. Asst. Prof. Surgery	1994-1996	
Washington Univ.	Res. Asst. Prof. Radiology	1994-1996	
Washington Univ.	Asst. Prof. of Surgery	1996-1997	
Washington Univ.	Asst. Prof. of Radiology	1996-1997	
Washington Univ.	Affiliate Asst. Prof. of EE	1996-1997	
Washington Univ.	Director of Craniofacial	1994-1997	
The Univ. of Iowa	Assistant Prof. of ECE	1997-2003	Signal & Image Proc., Circuits
The Univ. of Iowa	Associate Prof. of Radiation Oncology	2006-2008	
The Univ. of Iowa	Associate Prof. of ECE	2003-present	Signal & Image Proc., Computers, Circuits

2.2 Industrial

<u>Company</u>	<u>Position</u>	<u>Dates</u>
None		

2.3 Other

<u>Company, Firm, Agency</u>	<u>Position</u>	<u>Dates</u>
None		

3. Professional Activities

3.1 Scientific and Professional Societies

(Give grade of membership. List committee memberships, chairmanships, or offices held with inclusive dates.)

IEEE – Senior Member

3.2 Professional Registration (Give states in which registered)

None

3.3 Honors, Prizes, and Awards (Provide year of award)

- 1) 2008 Award for Outstanding Achievement in Teaching, College of Engineering, The University of Iowa.
- 2) 1st place Seimens 2007 Preclinical CT Image of the Year for “Imaging and analysis for the assessment of the normal mouse lung,” acquired by Eric A. Hoffman, Geoffrey McLennan, Joseph M. Reinhardt, Gary E. Christensen, Deokiee Chon, Eman Namati, Jacqueline Namati, Lijun Shi, Joo Hyun Song, Kunlin Cao, and Jered Sieren from the University of Iowa.
- 3) 2004-2007, The Robert and Virginia Wheeler Faculty Fellow of Engineering
- 4) 1/05 – 6/05, Obermann Scholar
- 5) 1997-2001 Whitaker Foundation Young Investigator.
- 6) 1995 Ebbsman Prize Honorable Mention, XIVth International Conference on Information Processing in Medical Imaging, Brest, France.
- 7) 1988 Outstanding Senior, Electrical Engineering Dept., Washington Univ.
- 8) 1988 Academic Excellence Award, Computer Science Dept., Washington Univ.
- 9) 1988 Graduated Magna Cum Laude in Electrical Engineering, Washington Univ.
- 10) 1988 Graduated Magna Cum Laude in Computer Science, Washington Univ.
- 11) 1984-1988 Robert W. Otto Scholarship.
- 12) 1984 First Place Overall, St. Louis Science Fair and Third Place in Physics at the International Science and Engineering Fair.

3.4 Consulting (Provide inclusive years)

Surgical Navigation Technologies - 1995-1996

IntellX - 1996-1998

3.5 Other

None

4. Service Activities

(Include activities of last two years and indicate scope of involvement and responsibility, i.e., committee member, chairman, etc. Provide inclusive dates for activities.)

4.1 Department

- | | |
|----------------|--|
| 9/10 – present | ECE Scholarship Committee Chairman |
| 9/10 – present | ECE/ME CIE Restructuring Committee |
| 9/10 – 10/10 | ECE/Radiology Joint DCG Committee |
| 9/09 – 5/10 | ECE Graduate Committee |
| 9/09 – 10/09 | ECE/Radiation Oncology Joint DCG Committee |
| 9/04 – 5/09, | ECE ABET Committee |
| 9/04 – 5/09, | ECE Undergraduate Committee |
| 10/07 – 5/10, | Help maintain the ECE web site |
| 8/00 – 10/07, | ECE Department web site designer and Webmaster |
| 5/06 – 5/08, | ECE DEO search Committee |
| 1/04 – 5/06, | ECE/Medical School Recruitment Committee |
| 1/04 – 5/04, | ECE-BME Medical Imaging Curriculum Committee. |
| 1/03 – 5/04, | ECE Undergraduate Recruitment Director |

9/03 – 5/04, Chairman, ECE Undergraduate Committee
 1/02 – 5/02, ECE Laboratory Committee
 9/98 – 12/99, 9/01 – 5/02, ECE Secretary
 9/00 – 12/00, ECE Self-Study Committee
 9/97 – 5/00, ECE Graduate Committee
 9/98 – 5/99, ECE Faculty Recruitment Committee

4.2 College

9/10 – present College of Engineering Grand Challenge committee
 9/09 – present, College of Engineering Teaching Committee
 3/08 – 5/10, Faculty/Staff Ad-hoc Workplace Environment Committee.
 9/05 – present, 57:017 Computers in Engineering Course Coordinator
 1998 – present, College of Engineering Parent Orientation presenter.
 2006 – present, Explore Engineering Day presenter.
 2/03 – 5/04, College Computer Services Committee, Chairman.

4.3 University

10/04 – present, Member and Imaging Group Computer Infrastructure Director of the Iowa Institute for Biomedical Imaging

4.4 Community, State, National and International

2010 **Reviewer**, International Conference on Medical Image Computing and Computer Assisted Intervention, (MICCAI 2010).
 2010 **Program Committee Member**, MMBIA 2010: IEEE Computer Society Workshop on Mathematical Methods in Biomedical Image Analysis.
 2010 **Technical Program Committee**, IEEE Southwest Symposium on Image Analysis and Interpretation (SSIAI 2010)
 2010 **Reviewer**, 2010 IEEE International Symposium on Biomedical Imaging (ISBI'10), April 14-17, 2010 Rotterdam, Netherlands.
 2010 **Scientific Review Committee Member**, 4th International Workshop on Biomedical Image Registration, (WBIR 2010).
 2009 **Program Committee Member**, 2nd Workshop on 3D Physiological Human 2009, (3DPH 2009).
 2009 **Scientific Review Committee Member and Board Member**, Information Processing in Medical Imaging 2009, (IPMI 2009).
 2009 **Program Committee Member**, MMBIA 2009: IEEE Computer Society Workshop on Mathematical Methods in Biomedical Image Analysis.
 2009 **Program Committee Member**, International Conference on Signal and Image Processing, (ICSIP 2009).
 2009 **Reviewer**, International Conference on Medical Image Computing and Computer Assisted Intervention, (MICCAI 2009).
 2008 **Reviewer**, Eleventh International Conference on Medical Image Computing and Computer Assisted Intervention, (MICCAI 2008).
 2008 **Technical Program Committee**, ninth IEEE Computer Society Workshop on Mathematical Methods in Biomedical Image Analysis (MMBIA) in conjunction with CVPR'08.
 2008 **Technical Program Committee**, 8th IEEE Southwest Symposium on Image Analysis and Interpretation (SSIAI 2008)

- 2008 **Reviewer**, 5th IEEE International Symposium on Biomedical Imaging (ISBI'08), May 14-17, 2008 in Paris, France.
- 2008 **Program Committee member**, Second International Conference on Cognition and Recognition during, Mysore, India, April 2008
- 2007 **Paper Reviewer**, Tenth International Conference on Medical Image Computing and Computer Assisted Intervention, (MICCAI 2007).
- 2007 **Program Committee member**, IEEE Computer Society Workshop on Mathematical Methods in Biomedical Image Analysis (MMBIA 2007) Rio de Janeiro, Brazil, 2007
- 2007 **Member** of the NIH Spatial-transformation Informatics Technology Initiative (SIFTI): a sub-committee of NIFTI to deal with the storage and interchange of non-linear spatial transformation information.
- 2007 **Scientific Review Committee member**, Tenth International Conference on Medical Image Computing and Computer Assisted Intervention, (MICCAI 2007).
- 2005-07 **President** of Information Processing in Medical Imaging board.
- 2004-present **External Scientific Advisory Committee Member**, Virginia Commonwealth University (VCU) Radiation Oncology Program Project Grant
- 2006 **Technical Program Committee member**, Ninth International Conference on Medical Image Computing and Computer Assisted Intervention, (MICCAI 2006).
- 2006 **Technical Program Committee member**, IEEE Computer Society Workshop on Mathematical Methods in Biomedical Image Analysis (MMBIA 2006) New York City, NY
- 2006 **Technical Program Committee member**, Third International Workshop on Biomedical Image Registration (WBIR 2006), Utrecht, The Netherlands
- 2006 **Technical Program Committee member**, the seventh IEEE Southwest Symposium on Image Analysis and Interpretation 2006 (SSIAI'06).
- 2006 **Technical Program Committee member**, the 2nd International Workshop on Computer Vision Approaches to Medical Image Analysis (CVAMIA'06).
- 2006 **Paper Selection Committee member** and **Technical Program Committee member** for the 2006 IEEE International Symposium on Biomedical Imaging: From Nano to Macro (ISBI'06).
- 2006 **Technical Program Committee member**, IEEE Computer Society Conference on Computer Vision and Pattern Recognition (CVPR 2006), New York, NY
- 2005 **General Conference Chairman**, 19th International Conference on Information Processing in Medical Imaging, (IPMI 2005), Glenwood Springs, CO.
- 2005 **Reviewer**, Eighth International Conference on Medical Image Computing and Computer Assisted Intervention, (MICCAI 2005).
- 3/7/05 **Study Section Member**, ZRG1 SBIB-Q 50R: PAR-03-106: Innovations in Biomedical Computational Science and Technology R21/R33.
- 2/3/05 **Study Section Member**, Special Emphasis Panel/Scientific Review Group 2005/05 NCI-E PCRB (Q3) meeting.
- 2004 **Reviewer**, Seventh International Conference on Medical Image Computing and Computer Assisted Intervention, MICCAI 2004.
- 2004 **Committee Member**, Computer Vision Approaches to Medical Image Analysis (CVAMIA) and Mathematical Methods in Biomedical Image Analysis (MMBIA) Workshop 2004.
- 2004 **Technical Conference Chairman**, 2nd IEEE International Symposium on Biomedical Imaging, ISBI 2004, Washington D.C.
- 2004 **Committee Member**, 17th International Conference on Pattern Recognition, ICPR 2004, Cambridge, United Kingdom.
- 2004 **Committee Member**, CARS 2004 Computer Assisted Radiology and Surgery, Chicago, IL.

- 2004 **Committee Member**, 2004 Southwest Symposium on Image Analysis and Interpretation, SSIAI 2004, Lake Tahoe, NV.
- 2003 **Committee Member**, 18th International Conference on Information Processing in Medical Imaging, IPMI 2003, Ambleside, England.
- 2003 **Committee Member**, The Second International Workshop on Biomedical Image Registration, WBIR 2003, Philadelphia, Pennsylvania.
- 2003 **Committee Member**, 17th International Congress and Exhibition Computer Assisted Radiology and Surgery CARS 2003, London, England.
- 2002 **Session Chair**, Fifth International Conference on Medical Image Computing and Computer Assisted Intervention MICCAI 2002, Tokyo, Japan.
- 2002 **Committee Member**, The Fifth Southwest Symposium on Image Analysis and Interpretation SSIAI 2002, Santa Fe, NM.
- 2002 **Committee Member**, International Symposium on Cardiovascular Imaging, Computer Assisted Radiology and Surgery, CARS 2002, Berlin, Germany.
- 2002 **Committee Member and Session Chair**, The First IEEE International Symposium on Biomedical Imaging, ISBI 2002, Washington DC.
- 2001 **Committee Member**, 17th International Conference on Information Processing in Medical Imaging, IPMI 2001, Davis, CA.
- 2001 **Committee Member**, Workshop on Mathematical Methods in Biomedical Image Analysis, MMBIA 2001, Kauai, HA.
- 2000 **Committee Member**, 3rd IEEE Workshop on Mathematical Methods in Biomedical Image Analysis, MMBIA 2000, Hilton Head Island, South Carolina.
- 2000 **Committee Member**, IEEE Southwest Symposium on Image Analysis and Interpretation, SSIAI 2000, Austin, Texas.
- 1999 **Committee Member**, International Workshop on Biomedical Image Registration, WBIR 1999, Ljubljana, Slovenia.
- 1998 **Committee Member**, Symposium on Cardiovascular Imaging, Iowa City, IA.

4.5 Student Related

4.5.1 Advisor to Student Groups

Faculty Advisor for the Team UI-ECE 2007 RoboCup virtual robots competition.
 Students: Zaid Towfic (ECE senior), James Harris (ECE grad student) Jeff
 McConnell (ECE sophomore), and Garrett Ejzak (ECE sophomore)

4.5.2 Special Counseling Services

None

4.5.3 Other Student Services

EIT review for circuits - 3/11/97

4.6 Other

None

5. Teaching Activities

5.1 Courses Taught (exclude directed reading, individual investigations, thesis research)

Semester	Course Number	Course Title	Semester Hours	No. of Students	Remarks
S'97	57:008	Electrical Circuits	3	55	
F'97	55:146	Digital Signal Processing	3	15	
S'98	55:248	Adv. Digital Image Proc.	3	6	
S'98	55:074	Independent Study (ADIP)	3	1	
F'98	55:146	Digital Signal Processing	3	23+11	video conf.
F'98	55:191	ECE Graduate Seminar	0	37	
S'99	55:042	Signals and Systems	3	15	
S'99	55:091	ECE Professional Seminar	0	27	
S'99	55:191	ECE Graduate Seminar	0	35	
F'99	55:042	Signals and Systems	3	43	
S'00	55:248	Adv. Digital Image Proc.	3	13	
S'00	55:090	ECE Orientation Seminar	0	3	
F'00	57:008	Electrical Circuits	3	117	
F'00	55:042	Signals and Systems	3	27	
S'01	55:042	Signals and Systems	3	17	
F'01	57:012	Linear Systems	3	41	
F'01	55:042	Signals and Systems	3	24	
S'02	55:248	Adv. Digital Image Proc.	3	14	
F'02	57:008	Electrical Circuits	3	125	
F'02	55:091	ECE Professional Seminar	0	29	
S'03	55:042	Signals and Systems	3	24	
S'03	57:008	Electrical Circuits	3	76	
F'03	55:148	Digital Image Processing	3	11	Electronic classroom
F'03	55:191	ECE Graduate Seminar	0	38	
S'04	57:017	Computers in Engineering	3	63	
S'04	55:248	Advanced Image Processing	3	13	
Sum'04	57:017	Computers in Engineering	3	22	
F'04	57:017	Computers in Engineering	3	77	
F'04	55:040	Linear Systems I	3	17	
S'05		Developmental Leave			
F'05	57:017	Computers in Engineering	3	62	
F'05	55:148	Digital Image Processing	3	19	Electronic classroom
F'05	55:090	EE Orientation Seminar	0	31	
S'06	57:017	Computers in Engineering	3	72	
F'06	57:017	Computers in Engineering	3	42	Electronic classroom
F'06	55:148	Digital Image Processing	3	26	Electronic classroom
S'07	57:017	Computers in Engineering	3	59	Laptop classroom
F'07	57:017	Computers in Engineering	3	58	Laptop classroom
S'08	57:017	Computers in Engineering	3	59	Laptop classroom

F'08	57:017	Computers in Engineering	3	39	Laptop classroom
S'09	57:017	Computers in Engineering	3	52	Laptop classroom
F'09	57:017	Computers in Engineering	3	52	Laptop classroom
S'10	59:006	Engineering Problem Solving 2	3	70	Laptop classroom
S'10	59:006	Engineering Problem Solving 2	3	65	Laptop classroom
F'10	57:017	Computers in Engineering	3	42	Laptop classroom
F'10	055:292	Sem Img Proc, Comp Vision & Med Imaging (IIBI Seminar)	0	23 (40+ attending)	

5.2 Graduate Student Advising and Committees

Notes:

1. Date of completion of degree, or expected date.
2. Topic or title of thesis.
3. Award nominations or awards earned by dissertation.
4. Student's first permanent position after graduation, if known.

5.2.a Ph.D. Dissertation Supervision

Hans Johnson, 6/97 – 5/02, Image Registration Methods for the Synthesis and Evaluation of Anatomical Population Summaries, **Ph.D. May 2002**. Information Technology Manager, Dept of Psychiatry, The University of Iowa.

Jianchun He, 6/99 – 8/03, Large Deformation Elastic Image Registration, **Ph.D. Aug 2003**. Research Assistant, Dept of Psychiatry, The University of Iowa.

Xiujuan Geng, 6/02 – 9/07, Transitive Inverse-Consistent Image Registration and Evaluation, **Ph.D. Dec 2007**. Post-doctorate assistant, National Institute of Health.

Dinesh Kumar, 8/03 – present, Image Registration Methods for Constructing Probabilistic Lung Atlases.

Joo Hyun Song, 6/03 – present, Medical Image Registration for Modeling Lung Motion.

Kunlin Cao, 9/06 – present, Estimation of Regional Lung Mechanics using Image Registration.

Cheng Zhang, 9/07 – present, Image Registration for Tracking Dose in Radiation Treatment Planning

Weichen Gao, 9/08 – present, Development of an Electronic Atlas for the Human Lung

Matineh Shaker, 9/08 – present, Development of an Electronic Atlas of the Mouse Lung

5.2b MS Thesis Supervision

Ayananshu Banerjee, 1/95 - 6/96, High-Dimensional Anatomical Maps and their Applications in Empirical Estimation Functional Imaging and Neuromorphometry, **M.S. May 1996**, Co-supervised with M.I. Miller at Washington University, St. Louis.

Peng Yin, 1/98 -12/99, Image Registration for Brachytherapy Treatment Planning in Radiotherapy of Cervical Cancer, **M.S. Dec 1999**, Design engineer, EMC Corp, Hopkinton, MA.

Francie McKee, 1/99 – 5/00, Measurement of Dysmorphic Infant Skull Shape Change due to Surgery and Growth Using Consistent Linear-Elastic Image Registration, **M.S. May 2000.**

Hans Johnson, 6/97-5/00, Method for Consistent Linear-Elastic Medical Image Registration, **M.S. May 2000.**

Blake Carlson, 6/99 – 5/01, Image Registration for Brachytherapy Treatment Planning in Radiotherapy of Cervical Cancer, **M.S. May 2001.** Software engineer, Etnus, Natick, MA.

John Dill, 6/00 – 5/02, Toolbox for Registration and Analysis, **M.S. May 2002.** Research Assistant, Dept of Psychiatry, The University of Iowa.

Dinesh Kumar, 8/01 – 8/03, Detection of Population Shape Differences Using Image Registration, **M.S. Aug. 2003.** Studying for PhD.

Rajesh Gangabathina, 7/02 – 12/03, Web-based Remote Processing System for Image Registration, **M.S. Dec 2003.** Software engineer. A2Z Inc, (<http://a2zshow.com>)

Joo Hyun Song, 6/03 – 12/05, 4D Tracking Lung Tissue in Limited View Multislice CT with Inverse Consistent Image Registration, **M.S. Dec 2005.** Studying for PhD.

Tom Idstein, 8/04 – 7/06, Building a low-cost, moderate resolution device to measure the uptake and distribution in time and space of P.E.T. radio-pharmaceuticals. Co-advising with Richard Hichwa. **M.S. Aug. 2006.**

Jake Nickel, 1/07 – 5/08, Development of an Electronic Lung Airway Atlas. **M.S. May 2008.** Working at Rockwell-Collins.

Kunlin Cao, 9/06 – 5/08, Local Lung Tissue Expansion Analysis based on Inverse Consistent Image Registration. **M.S. May 2008.** Studying for PhD.

James Harris, 5/07 – 8/08, Nonrigid Image Registration Evaluation Project Software Design. **M.S. Aug. 2008.**

Ying Wei, 9/07 – 12/09, Non-rigid Image Registration Evaluation using Common Evaluation Database. **M.S. Dec. 2009.**

Jeffrey Hawley, 6/09 – present, Software Design of the Nonrigid Image Registration Evaluation Project User Interface.

5.2c Ph.D. Committee Membership

Renuka Uppaluri, Automated Analysis of Pulmonary Parenchyma From CT Images, **Ph.D. S'97,** Thesis supervisor: Milan Sonka.

Weidong Liang, Automated Vessel Segmentation and Vessel Diameter Measurement in Brachial Ultrasound Time Series, **Ph.D. S'98,** Thesis supervisor: Milan Sonka.

Marek Brejl, Automated Initialization and Automated Design of Border Detection Criteria in Edge-based Image Segmentation, **Ph.D. F'99,** Thesis supervisor: Milan Sonka.

Roberto Lopez-Valcarce, Blind Equalization of Linear and Nonlinear Digital Communication Channels from Second Order Statistics, **Ph.D. F'00,** Thesis supervisor: Soura Dasgupta.

Jan Kybic, Elastic Image Registration Using Parametric Deformation Models, **Ph.D. Sum'01,** Swiss Federal Institute of Technology, Lausanne, Switzerland. Served as Expert on Thesis committee. Thesis supervisor: Michael Unser.

Qingyu Li, Blind Source and Channel Equalization, **Ph.D. Sum'03,** Thesis supervisor: Er-Wei Bai.

Juerg Tschirren, Segmentation, Anatomical Labeling, Branchpoint Matching, and Quantitative Analysis of Human Airway Trees in Volumetric CT Images, **Ph.D. F'03,** Thesis supervisor: Milan Sonka.

Steve Mitchell, Active Appearance Model Segmentation in Medical Image Analysis, **Ph.D. Sum'04,** Thesis supervisor: Milan Sonka.

Ben Baojun Li, Inter-Subject Registration and Warping of CT Images to Establish a Normative Human Lung Atlas, **Ph.D. F'04,** Thesis supervisor: Joe Reinhardt.

Mark Olszewski, Assessment of Coronary Artherosclerosis Using Intravascular Ultrasound and Multidetector Computed Tomography, **Ph.D. F'05**, Thesis supervisor: Milan Sonka.
 Fuxing Yang, Quantitative Analysis of Living Tumor Cells Using Large Scale Digital Cell Analysis System, **Ph.D. S'05**, Thesis supervisor: Milan Sonka.
 Xiangwei Zhang, Computer Aided Detection of Pulmonary Nodule in Helical CT Images, **Ph.D. F'05**, Thesis supervisor: Milan Sonka.
 Honghai Zhang, Segmentation and Computer-Aided Diagnosis of Cardiac MR Images Using 4-D Active Appearance Models, **Ph.D. Sum'07**, Thesis supervisor: Milan Sonka.
 Fei Zhao, Congenital Aortic Disease: 4D Magnetic Resonance Segmentation and Quantitative Analysis, **Ph.D. F'07**, Thesis supervisor: Milan Sonka.
 Yin Yin, Multi-Surface Multi-Object Optimal Image Segmentation: Application in 3D Knee Joint Imaged by MRI, Thesis supervisor: Milan Sonka.
 Nathan Cahill, S'10
 Kia Ding, PhD., S'10
 Joseph M. Howard, Ph.D., F'10
 Vladlena Gorbunova, PhD, F'10, Image Registration of Lung CT Scans for Monitoring Disease Progression, University of Copenhagen
 Yichao Wang, VCU

5.3 Undergraduate Student Advising and Mentoring

Freddy B. So, 7/95 – 6/96, craniofacial archive recovery, Washington University.
 Blake Carlson, 6/98 – 5/99, ATM high speed networking.
 Husam Abu-Zaydeh, 6/99 – 12/99, developed a user interface for deformable image software.
 Luke Hirschy, 6/00 – 8/00, registered data sets for a collaborative project with Christian Barillot.
 Joel Martin, 6/01 – 8/01, created and validated average brain data sets.
 Nichole Taylor, 6/06 – 7/06, AGEP summer student from Iowa State University, Developed a Web site for the Nonrigid Image Registration Evaluation Project
 Jake Nickel, 1/06 – 12/07, Developing computer atlas of human and rat lung.
 Deffo (Michael) Tamboue, 6/07-7/07, AGEP summer student from Jackson State University, Helped implement an XML parser for the Nonrigid Image Registration Evaluation Project
 Hayley Abbas, 5/07 – 12/07, Created Medical Image Artwork.
 Jeffrey Hawley, 5/07 – 5/09, Visualization for Nonrigid Image Registration Evaluation Project
 Kate Rasing, 1/08 – present, Web site design for Nonrigid Image Registration Evaluation Project
 James M. Howard, 6/08 – 7/08, AGEP summer student from Mississippi Valley State University, Building software tools for the Nonrigid Image Registration Evaluation Project

5.3a Undergraduate Student Project Supervision

Notes:

1. Honor projects, undergraduate and graduate directed study, non-thesis special investigations, etc.
2. Student awards arising from this work. If any

Blake Carlson, High Performance ATM Networking and The Washington University Gigabit Switch, honors project, S'99.
 Fred Collison, 8/01 – 5/02, Biomedical Engineering Senior Design project.
 John Gourley, 8/01 – 5/02, Biomedical Engineering Senior Design project.
 Michal Rysz, 1/02 – 5/02, Biomedical Engineering Senior Design project.
 Brent Owen, 10/03- 5/04, Biomedical Engineering Senior Design project

Sara Juvenal, 10/03- 5/04, Biomedical Engineering Senior Design project.
 Peiman Mohammadi, 10/03- 5/04, Biomedical Engineering Senior Design project
 David Simon, 1/06 – 5/06, RoboCup 2006, Honors project
 Nick Kiguta, 1/07 – 5/07, Honors project & Developing computer atlas of human.
 Ben Mossman, 9/08 – 5/09, EE Senior Design project customer
 Daniel Lee, 9/08 – 5/09, EE Senior Design project customer
 Dmitry Kallestinov, 9/08 – 5/09, EE Senior Design project customer
 Daniel Juel, 9/08 – 5/09, EE Senior Design project customer

5.3b Other Student Mentoring and Special Advising

Notes:

1. Name of program, nature of activities; includes interdepartmental advising.

Sem	Student	Description ¹
-----	---------	--------------------------

None

5.3c Undergraduate Student Advising

Semester	Number of Advisees
S'97	27
F'97	14
S'98	12
F'98	16
S'99	15
F'99	19
S'00	19
F'00	10
S'01	15
F'01	12
S'02	14
F'02	21
S'03	24
F'03	23
S'04	Forgot to record
F'04	Forgot to record
S'05	Developmental Leave
F'05	18
S'06	20
F'06	18
S'07	21
F'07	20
S'08	19
F'08	Forgot to record
S'09	16
F'09	12
S'10	11
F'10	

5.4 Supervision of Postdoctoral Associates

Note:

1. Associate's present position, if known.

<u>Sem</u>	<u>Name</u>	<u>Project Description</u>	<u>Present Position</u> ¹
None			

5.5 Seminars and Short Courses

7/97, Milwaukee, WI, American Association of Physicists in Medicine (AAPM), "Electronic Anatomic Atlases for Medical Imaging," conference tutorial, presented with Michael W. Vannier.

7/99, Nashville, TN, American Association of Physicists in Medicine (AAPM), "Advancements in Visualization," conference symposium, one of four invited speakers.

5.6 Advisor to Student Groups

Note:

1. Name of program, nature of activities.

<u>Sem</u>	<u>Group</u>	<u>Description</u> ¹
None		

5.7 Teaching Awards and Nominations

Note:

1. Indicate if nominated but not awarded.

Date	Title	Grantor	Selection Process	Nominee ¹
2007	President's Instructional Technology Innovation Award	University of Iowa President	Dept & College Recommendations	Nominated but did not win
5/2008	Outstanding Mentor Award 2008	University of Iowa Graduate College	Student & Dept Recommendations	Nominated but did not win
2008	2008 Award for Outstanding Achievement in Teaching	University of Iowa College of Engineering	Dept Recommendations	won

5.8 Formative Evaluations

(listing of efforts undertaken to improve personal teaching effectiveness, including peer observation, etc.)

8/29/97 Attended a 2 hour class entitled "How to give a Lecture" sponsored by the Center for Teaching, The University of Iowa.

10/11/97 Attended Outcomes Assessment in Engineering, 59th Annual ASEE North Midwest Section Meeting, The University of Iowa.

8/07 – 5/08 Attended the lectures of 22M:160 and 22M:161 taught by Oguz Durumeric to learn the material and study Oguz Durumeric's teaching style.

5.9 Textbooks and Educational Publications

None

5.10 Funded and Unfunded Course, Curriculum, Software, and Laboratory Development (listing of developmental efforts and innovations focused on improvement of instruction, including efforts to obtain external funding for laboratory and curricular development)

1. P.I. on grant entitled "ATM Distributed Medical Imaging." The goal of this grant is to connect the Medical School and College of Engineering together via high-speed ATM network for research purposes and to provide access to ATM technology for classroom instruction.
2. 12/06-1/07 Helped design and implement the 72 seat laptop classroom in 2229 SC. This classroom increased the number of student accessible computers in the College of Engineering by more than 50% (from 140 to 220). It provided a second electronic classroom in the college and made it possible to teach interactive lectures for courses with large class size.
3. 1/07-5/07 Taught the first course in the laptop classroom and developed interactive lectures for the course 57:017 Computers in Engineering.

5.11 Other

(Attendance at teaching workshops; student comments of particular interest; etc.)

- 10/2/98 Together with Milan Sonka, organized a trip to the Mayo Clinic, Rochester, MN for 10 graduate students to give short presentations.
- 11/20/98 Together with Milan Sonka, organized a trip for 10 graduate students from the Mayo Clinic to give short presentations to the CEIG at the University of Iowa.
- 10/6/00 Together with Milan Sonka, organized a trip to the Mayo Clinic, Rochester, MN for 16 graduate students to give short presentations.
- 7/11 – 7/15/05 Together with Milan Sonka, organized the 19th International Conference on Information Processing in Medical Imaging 2005 Colorado Mountain College, Glenwood Springs, Colorado, USA. As part of this conference we brought 9 of our graduate students to work as staff members and attend the conference.
- 6/15/07 Organized a trip to the Mayo Clinic in Rochester MN for 18 graduate students to attend the Mayo Clinic Symposium on "Medical Image Computing and Image Guided Intervention"
- 6/24 – 6/29/07 Organized and funded a trip to the Massachusetts Institute of Technology for 8 of my graduate students and one of Joe Reinhardt's students to participate in the fifth National Alliance for Medical Image Computing (NA-MIC) Programming Project week event.
- 8/21/07 Helped organize and run the first annual Introduction to Iowa Institute of Biomedical Imaging (IIBI) Boot Camp. Attendees include 8 medical imaging professors, 4 staff, 27 students, and 3 postdocs.
- 6/23 – 6/27/08 Organizing and funded a trip to the Massachusetts Institute of Technology for 6 of my graduate students to participate in the sixth National Alliance for Medical Image Computing (NA-MIC) Programming Project week event.
- 7/14 – 7/18/08 Organizing and funded a trip for three of graduate students to the Summer School on "Mathematics in Brain Imaging" at UCLA's Institute for Pure and Applied Mathematics (IPAM).
- 8/19/08 Helped organize and run IIBI Boot Camp 2008.

6. Research Activities

6.1 Active research fields at present (major fields only)

Computational Anatomy, Medical Imaging, Signal and Image Processing, Pattern Theory

6.2 Principal Investigator on contracts and/or grants (last five years)

Contract or Grant Title	Sponsor	Start and End Date	Budget (yearly)	Acct. No.	Percent Credit
Image Registration for Image-Guided Adaptive Radiation Therapy (Williamson, Virginia Commonwealth University PI, Christensen, subcontract PI),	NIH/NCI	4/07-3/12	\$61,281	P01 CA116602	100%
NIREP: Non-rigid Image Registration Evaluation Project	NIH/NIBIB	6/06 – 5/10	\$212,500	R33 EB004126	100%
NIREP: Non-rigid Image Registration Evaluation Project	NIH/NIBIB	6/05 – 5/06	\$100,000	R21 EB004126	100%
Career Development Award	Obermann Center	1/05-5/05	\$500	N/A	100%
Information Processing in Medical Imaging 2005 Conference grant	Obermann Center	3/05	\$750	N/A	100%
Information Processing in Medical Imaging 2005 Conference grant	NIH	3/05 to 2/06	\$10,000	R13EB005133	100%
Information Processing in Medical Imaging 2005 Conference grant	The Whitaker Foundation	1/05 to 7/05	\$5,000	N/A	100%
Lung Trajectory Mapping for IMRT (Low, Washington University, Christensen Subcontract PI)	NIH	4/03 to 3/07	\$47,082	R01 CA096679	100%
Quantitative Characterization of Congenital Skull Shape Deformity	The Whitaker Foundation	4/00 to 6/01	\$80,000	N/A	100%
Modeling Cranial Dymorphology and Its Correction Using Pattern Theory	The Whitaker Foundation	8/97 to 1/00	\$125,893	N/A	100%
ATM Distributed Medical Imaging	Washington University / NSF	11/98 to 11/01	\$80,000 equipment	N/A	100%
A High-Speed Network for Distributed Medical Imaging: Phase 1	The University of Iowa (Old Gold)	7/98	\$6000	N/A	100%
Image-Based Dose Planning in Intracavitary Brachytherapy (Williamson, Washington University, PI, Christensen Image Registration Project Leader)	NIH	07/98 to 02/2002	\$165,423	R01 CA75371	100%

*Responsibility as a percentage of the grant budget

6.3 Participation (5 hours/week or more) in research contracts and/or grant

Contract or Grant Title	Sponsor	Start and End Date	Budget	Acct. No.	Percent Credit
Precise Correspondence of 3D Pathology With Radiological Features in Lung Nodules (McLennan)	NIH/NCI	9/08 to 7/12	\$386,354	CA129022	5%
Large-Scale Computing and Visualization for Cardiopulmonary Imaging (Lin), Instrumentation grant	NIH/NCRR	2/08	\$473,636	1S10RR22421-01A2	10%
Regional Lung Mechanics by 3D Image Registration (Reinhardt, PI)	NIH/NHLBI	4/06 to 3/011	\$326,783	R01 HL079406	10%
Quantitative CT-Based Lung Atlas of the Mouse (Hoffman)	NIH/NHLBI	7/06 to 6/11	\$456,804	R01 HL080285	10%
Image and Model Based Analysis of Lung Disease (Hoffman, PI)	NIH	12/99 to 6/10	\$1,993,762	R01 HL64368	5%
3D Imaging & Computer Model of the Respiratory Tract (Corley, PI, Hoffman, Subcontract PI)	NIH/NHLBI	9/04 to 8/09	\$32,035	R01HL073598	50%
Spiral CT for Cochlear Implantation Research Plan (Wang, G., PI)	NIH	4/99 to 3/2004	\$685,480	R01 DC03590	8%
Normal MR Neuromorphometry by Global Pattern Matching (Vannier PI)	NIH/NIDS	4/96 to 3/2001	\$1,510,332	R01 NS35368	15%
A Collaborative Educational Environment for Functional Cardiovascular Image Analysis (Chandran, PI)	The Whitaker Foundation	1/97 to 11/98	\$308,517	N/A	4%

Pending contracts and/or grants

Contract or Grant Title	Sponsor	Start and End Date	Budget	Acct. No.	Percent Credit

Invited Presentations:

1. **Christensen, G.E.**, Rabbit, R.D., Miller, M.I. A deformable neuroanatomy textbook based on viscous fluid mechanics. 1993 Conference on Information Sciences and Systems, Johns Hopkins University, March, 1993. Invited by Clem Karl.

2. **Christensen, G.E.**, Miller, M.I. Deformations of Anatomical Shape. 1994 SIAM Annual Meeting, San Diego, California, July, 1994. Invited by Yali Amit.
3. **Christensen, G.E.**, Miller, M.I. Theory Institute on Large-Scale Medical Imaging, Argonne National Laboratories, August, 1995. Invited by Man Kam Kwong.
4. **Christensen, G.E.**, Image Registration via Global Shape Models. Approaches to Symbolic Representations of Brain Structures, Workshop at the Max-Planck Institute of Cognitive Neuroscience, Leipzig, Germany, December, 1997. Invited by Frithjof Kruggel.
5. **Christensen, G.E.**, Synthesizing Average Brain Shape and Validation, Institute for Pure and Applied Mathematics Workshop on Mathematics and Modeling in Brain Mapping, UCLA, May, 2001. Invited by Paul Thompson and Arthur Toga.
6. **Christensen, G.E.**, Consistent Landmark and Intensity Based Image Registration, Swiss Federal Institute of Technology, Lansanne, Switzerland, June, 2001. Invited by Michael Unser.
7. **Christensen, G.E.**, Minimizing Sources of Errors in Medical Image Registration, First IEEE International Symposium on Biomedical Imaging. Washington DC. July, 2002, Invited by Christos Davatzikos.
8. **Christensen, G.E.**, Medical Image Registration, Fifth International Conference on Medical Image Computing and Computer Assisted Intervention. Tokyo, Japan. September, 2002, Invited by Paul Thompson.
9. **Christensen, G.E.**, Virginia Common Wealth University, Richmond Virginia, November, 2002. Invited by Jeff Williamson.
10. **Christensen, G.E.**, MIT Martinos talk. Martinos Center for Biomedical Imaging, MGH-NMR and MIT, Boston, May, 2003. Invited by Bruce Fischl.
11. **Christensen, G.E.**, 2004 IEEE International Symposium on Biomedical Imaging From Nano to Macro, Arlington, Virginia, April, 2004. Invited by Paul Thompson.
12. **Christensen, G.E.**, Computer Vision Approaches to Medical Image Analysis (CVAMIA) and Mathematical Methods in Biomedical Image Analysis (MMBIA) Workshop, Prague, Czech Republic, May, 2004. Invited by Milan Sonka.
13. **Christensen, G.E.**, Building an anatomical atlas. Pacific Northwest National Laboratories BRP meeting 6/1/05. Invited by Richard Corley.
14. **Christensen, G.E.**, Transitive and Inverse-Consistent Image Registration at AAPM regional meeting held at The University of Iowa, 11/2/05. Invited by John Bayouth.
15. **Christensen, G.E.**, Craniofacial Image Analysis for Biology, Clinical Genetics, Diagnostics and Treatment, October 6, 2006 in Copenhagen, Denmark. Invited by Tron Darvann.
16. **Christensen, G.E.**, Introduction to the Non-Rigid Image Registration Evaluation Project (NIREP), SPIE Workshop "Validation in medical image registration", February 18, 2007. Invited by Pierre Jannin.
17. **Christensen, G.E.**, Topics in Medical Image Registration, Center for Imaging Science, April 17, 2007, Johns Hopkins University, MD. Invited by Laurent Younes.
18. **Christensen, G.E.**, Inverse Consistent Image Registration and Evaluation, MICCAI 2007 Workshop Statistical Registration: Pair-wise and Group-wise Alignment and Atlas Formation, Brisbane, Australia; November 2, 2007 Invited by Lilla Zollei.

19. **Christensen, G.E.**, Non-rigid Image Registration Evaluation Project (NIREP), Mathematical Methods for Medical Image Analysis (MMMIA), Nov. 4-9, 2007, Banff, Canada. Invited by Rafeef Abugharbieh and Ghassan Hamarneh.
20. **Christensen, G.E.**, Linear and Non-linear Registration, ISMRM 16th Annual Meeting, Toronto, Ontario, Canada, 3 – 9 May 2008. Invited by Mark Jenkinson and Dave Hawkes.
21. **Christensen, G.E.**, Image registration and spirometry for tumour tracking, ESTRO 27 – Goteborg, Sweden, 14 – 18 September 2008. Invited by Vincent Gregoire and Tommy Knöös.
22. **Christensen, G.E.**, Advances in Image registration, University of Copenhagen, Denmark. Nov 1, 2010. Invited by Marleen de Bruijne.
23. **Christensen, G.E.**, Advances in Image registration, University of Pennsylvania, Dec 8, 2010. Invited by Christos Davatzikos.

Presentations:

1. **Christensen, G.E.**, Miller, M.I., Amit, Y., Grenander, U. Global shape models for anatomical structures. 26th Conference on Information Sciences and Systems, Princeton University, March, 1992.
2. **Christensen, G.E.**, Miller, M.I. Deformable Anatomical Data Bases for MR, PET, and CT. Midwest Workshop in Iterative Image Reconstruction, University of Minnesota, VA Medical Center, September, 1992.
3. **Christensen, G.E.**, Miller, M.I. A Deformable Neuroanatomy Textbook. 1992 Visualization in Biomedical Computing Conference, University of North Carolina, Chapel Hill, October, 1992. Computer demonstration.
4. **Christensen, G.E.**, Miller, M.I., Vannier, M.W. A 3D deformable magnetic resonance textbook based on elasticity. 1994 Spring Symposium: Applications of Computer Vision in medical Image Processing, Stanford University, March, 1994.
5. Miller, M.I., **Christensen, G.E.** Brain Mapping Today, and into the Future ..., 1994 Midwest Workshop in Iterative Image Reconstruction, Washington University, St. Louis, MO, June, 1994.
6. **Christensen, G.E.** Individualized electronic craniofacial textbooks. The annual meeting of the American Cleft Palate-Craniofacial Association, Tampa, Florida, April, 1995.
7. **Christensen, G.E.**, Rabbit, R.D., Miller, M.I., Joshi, S.C., Grenander, U., Coogan, T., Van Essen, D.C. Topological properties of smooth anatomic maps. Proceedings of the 16th International Conference on Information Processing in Medical Imaging, Brest, France, June, 1995.
8. **Christensen, G.E.**, Miller, M.I., Marsh, J.L., Vannier, M.W. Automatic Analysis of Medical Images Using a Deformable Textbook. 1995 Computer Aided Radiology Conference, Berlin, Germany, June, 1995.
9. **Christensen, G.E.** A Deformable Atlas for Modeling Craniofacial Deformities. Workshop: Pattern-Theoretic Knowledge Representation, St. Louis, MO, April 18-19, 1996.
10. **Christensen, G.E.**, Kane, A.A., Marsh, J.L., Vannier, M.W. Synthesis of an Individualized Cranial Atlas with Dysmorphic Shape. Mathematical Methods in Biomedical Image Analysis, San Francisco, CA, June, 1996.
11. **Christensen, G.E.**, Kane, A.A., Marsh, J.L., Vannier, M.W. A 3D Deformable Infant CT Atlas, CAR '96: Computer Assisted Radiology, Paris, France, June, 1996.

12. **Christensen, G.E.**, Williamson, J.F., Chao, K.S.C., Miller, M.I., So, F.B., Vannier, M.W. Deformable Anatomical Templates for Brachytherapy Treatment Planning in Radiotherapy of Cervical Cancer, SPIE's 42nd Annual Meeting, Vision Geometry VI, San Diego, CA, July, 1997.
13. Vannier, M.W., **Christensen, G.E.**, Electronic Anatomic Atlases for Medical Imaging, American Association of Physicists in Medicine (AAPM) Annual Meeting, Milwaukee, WI, July, 1997.
14. Johnson, H.J., **Christensen, G.E.**, Haller, J.W., Melloy, J. Vannier, M.W. Synthesizing Average 3D Anatomical Shapes, Biomedical Engineering Seminar, Mayo Clinic, Rochester, MN, Oct., 1998.
15. **Christensen, G.E.**, Johnson, H.J., Haller, J.W., Melloy, J., Vannier, M.W., Marsh, J.L., Synthesizing average 3D anatomical shapes using deformable templates, Medical Imaging 1999: Image Processing, San Diego, CA, Feb., 1999.
16. Vannier, M.W., **Christensen, G.E.**, Rob, R., Napel, S., Advancements in Visualization, American Association of Physicists in Medicine (AAPM) Annual Meeting, Nashville, TN, July, 1999.
17. **Christensen, G.E.**, Consistent Image Registration, Workshop to honor Donald L. Snyder, Sachs Professor of Electrical Engineering, Washington University, St. Louis, MO, Jan., 2000.
18. **Christensen, G.E.**, Yin, P. Vannier, M.W., Chao, K.S.C., Dempsey, J.F., Williamson, J.F. Large-Deformation Image Registration using Fluid Landmarks, IEEE Southwest Symposium on Image, Austin, Texas, April, 2000.
19. **Christensen, G.E.**, He, J., Consistent Nonlinear Elastic Image Registration, IEEE Proceedings of Mathematical Methods in Biomedical Image Analysis, Kauai, Hawaii. Dec., 2001.
20. **Christensen, G.E.**, He, J., Large Deformation Inverse Consistent Elastic Image Registration, Information Processing in Medical Imaging, Ambleside, United Kingdom, July, 2003.
21. **Christensen, G.E.**, Inverse Consistent Medical Image Registration, Dept. of Electrical Engineering, The University of Southern California, Jan., 2005.

6.4 Other important facts or information

(Research proposals submitted, new research programs under development, seminars presented, etc.)

1. 1R01RR15228-01 grant submission: Population Analysis via Consistent Image Registration, **G.E. Christensen (PI)**, October, 1999, priority score 221 and a percentile of 32.3. Not funded.
2. 1R01DE14162-01 grant resubmission: Morphometric Analysis via Consistent Image Registration, **G.E. Christensen (PI)**, July, 2000, priority score 238 and a percentile of 43.1. Not funded.
3. R01CA75371-05 grant resubmission: Image-based Dose Planning in Intracavetary Brachytherapy, **G.E. Christensen (subcontract PI)**, Sponsoring Agency: Washington University/NIH, July, 2001, priority score 242 and a percentile of 47. Not funded.
4. 1 RC1 EB011429-01 - Non-rigid Image Registration Evaluation Project for Lung Imagery: NIREP-LUNG, **G.E. Christensen (subcontract PI)**, Sponsoring Agency: NIH, April, 2009, Not funded.

6.5 Research highlights (one paragraph)

I introduced the notion of consistent image registration to the medical imaging community in 1999. Consistent image registration reduces registration error by minimizing the error between the forward and reverse transformations between the two images. Although consistent image registration cannot

guarantee a unique registration between two biological images, it does provide more biologically relevant correspondence mappings than the traditional unidirectional registration algorithms. The fundamental idea is relevant to all methods that require correspondence between two images, or a shape model and an image, or between two shape models, etc. This idea has been incorporated into many algorithms reported in the literature since the initial presentation. In collaboration with Michael I. Miller & Richard Rabbit, we were the first research group to perform 2D & 3D image registration using a fluid deformable model. In July 1996, three colleagues and I applied for a patent entitled "Method and Apparatus for Image Registration" which describes new algorithms for fast image registration. This patent describes improved high-dimensional, nonlinear image registration algorithms that can practically run on desktop workstations instead of supercomputers. I have been invited to give seven lectures, one of which resulted in an article in Science entitled "Computer Processing Gives Imaging a Sharper View", Science, 169 (5229), Sept. 1995, p. 1338 reporting on my research. In 1992, my research project was written up in an article in the Science News entitled "Brain Warping", Science News, 144 (24), Dec. 1993, pp. 392-394. In 1995, I presented a talk at the prestigious Information Processing in Medical Imaging conference and was awarded honorable mention for Franswa Ebbsman Prize.

7. Publications

7.1 Books and monographs. (Limit to textbooks, research monographs, conference/symposium/congress proceedings, handbooks, etc., of which you are an author or an editor. Do not include articles or chapters in such media.)

Conference Proceedings:

1. Leahy, R.M., Roux, C., **Christensen, G.E.**, Wilson, D.L. eds., Proceedings of the 2004 IEEE International Symposium on Biomedical Imaging: From Nano to Macro, Arlington, VA, USA, April 15-18, 2004, IEEE, CDROM.
2. **Christensen, G.E.**, Sonka, M. eds. Information Processing in Medical Imaging: 19th International Conference, IPMI 2005, Glenwood Springs, CO, USA, July 10-15, 2005, Proceedings, Springer, Lecture Notes in Computer Science, LNCS 3565, 777 pages.

7.2 Articles in technical journals with rigorous review procedures. (Include notes, discussions, letters to editor, etc., which are published in such journals and those articles or chapters in a meeting's printed record if that record utilizes review procedures equivalent to those for archive journals.)

Journal Papers:

1. Miller, M.I., **Christensen, G.E.**, Amit, Y., Grenander, U. Mathematical textbook of deformable neuroanatomies. Proceedings of the National Academy of Sciences, December, 1993, 90(24), pp. 11944-11948.
2. **Christensen, G.E.**, Rabbit, R.D., Miller, M.I. 3D brain mapping using a deformable neuroanatomy. Physics in Medicine and Biology, March, 1994, (39) pp. 609-618.
3. **Christensen, G.E.**, Miller, M.I., Grenander, U., Vannier, M.W. Individualizing Neuroanatomical Atlases Using a Massively Parallel Computer. IEEE Computer, January, 1996, pp. 32-38.
4. Haller, J.W., **Christensen, G.E.**, Joshi, S.C., Newcomer, J.W., Miller, M.I., Csernansky, J.G., Vannier, M.W. Hippocampal MR Morphometry by Pattern Matching. Radiology, June 1996, (199) pp. 787-791.

5. **Christensen, G.E.**, Rabbit, R.D., Miller, M.I. Deformable Templates Using Large Deformation Kinematics. *IEEE Transactions on Image Processing*, 5(10), Oct 1996, pp. 1435-1447.
6. Sheline, Y.I., Black, K.J., Lin, D.Y., **Christensen, G.E.**, Gado, M.H., Brunsten, B.S., and Vannier M.W. Stereological MRI Volumetry of the Frontal Lobe. *Psychiatry Research: Neuroimaging*, 67(3), Oct., 1996, pp. 203-214.
7. Vannier, M.W., Marsh, J.L., Wang G., **Christensen, G.E.**, and Kane, A.A. Surgical Imaging Systems. *Surgical Technology International*, 5, 1996, PMID: 15858714, pp. 35-42.
8. Haller, J.W., Banerjee, A., **Christensen, G.E.**, Gado, M., Joshi, S.C., Miller, M.I., Sheline, Y., Vannier, M.W., Csernansky, J.G. 3D Hippocampal Morphometry by High Dimensional Transformation of a Neuroanatomical Atlas. *Radiology*, 202(2), Feb 1997, pp. 504-510.
9. Kane, A.A., Lo, L.J., **Christensen, G.E.**, Vannier, M.W., Marsh, J.L. Relationship between Bone and Muscles of Mastication in Hemifacial Microsomia. *Plastic and Reconstructive Surgery*, 99, April, 1997, pp. 990-999.
10. Miller, M.I., Banerjee, A., **Christensen, G.E.**, Joshi, S.C., Khaneja, N., Grenander, U., Matejic, L. Statistical Methods in Computational Anatomy. *Statistical Methods in Medical Research*, vol. 6, June 1997, pp. 267-299.
11. **Christensen, G.E.**, Joshi, S.C., Miller, M.I. Volumetric Transformation of Brain Anatomy. *IEEE Transactions on Medical Imaging*. 16(6), Dec., 1997, pp. 864-877.
12. **Christensen, G.E.**, MIMD vs. SIMD Parallel Processing: A Case Study in 3D Medical Image Registration. *Parallel Computing*. Vol. 24, Jan 1998, pp. 1369-1383.
13. **Christensen, G.E.**, Johnson, H.J., Consistent Image Registration, *IEEE Transactions on Medical Imaging*. 20(7), July 2001, pp. 568-582.
14. **Christensen, G.E.**, Carlson, B., Chao K.S.C., Yin, P., Grigsby, P.W., Nguyen, K., Dempsey, J.F., Lerma, F.A., Bae, K.T., Vannier, M.W., Williamson, J.F., Image-Based Dose Planning of Intracavitary Brachytherapy: Registration of Serial Imaging Studies using Deformable Anatomic Templates, *International Journal of Radiation, Oncology, Biology, and Physics*. 51(1), Jan 2001, pp. 227-243.
15. Perlyn, C.A., Marsh, J.L., Vannier, M.W., Kane, A.A., Koppel, P. Clark, K.W., **Christensen, G.E.**, Knapp, R., Lo L.J., Govier, D. The Craniofacial Anomalies Archive at St. Louis Children's Hospital: 20 years of Craniofacial Imaging Experience. *Plastic and Reconstructive Surgery*. 108(7), Dec 2001, pp. 1862-1870.
16. Johnson, H.J., **Christensen, G.E.**, Consistent Landmark and Intensity-based Image Registration, *IEEE Transactions on Medical Imaging*, 21(5), May 2002, pp. 450-461.
17. **Christensen, G.E.**, Johnson, H.J., Invertibility and Transitivity Analysis for Nonrigid Image Registration, *Journal of Electronic Imaging*, 12(1) January, 2003, pp. 106-117.
18. Li, B., **Christensen, G.E.**, McLennan, G., Hoffman, E.A., Reinhardt, J.M., Establishing a normative atlas of the human lung: Inter-subject warping and registration of volumetric CT, *Academic Radiology*, 10(3) March, 2003, pp. 255-265.
19. Magnotta, V.A., Bockholt, H.J., Johnson, H.J., **Christensen, G.E.**, Andreasen, N.C., Subcortical, Cerebellar and MR Based Consistent Brain Image Registration, *NeuroImage*, 19(2), June 2003, pp. 233-245.
20. Hellier, P., Barillot. C., Corouge, I., Gibaud, B., Le Boualher, G., Collins, L., Evans A., Malandain, G., Ayache N., **Christensen, G.E.**, Johnson, H.J., Retrospective Evaluation of Inter-subject Brain Registration, *IEEE Transactions on Medical Imaging*, 22(9), Sept 2003, pp. 1120-1130.

21. Low, D.A., Nystrom, M., Kalinin, E., Parikh, P., Dempsey, J.F., Bradley, J.D., Wahab, S.H., Islam, T., **Christensen, G.E.**, Politte, D., Whiting, B., A Method for the Reconstruction of 4-Dimensional Gated CT Scans During Free Breathing, *Medical Physics*, 30(6), June 2003, pp. 1254-1263.
22. **Christensen, G.E.**, He, J., Dill, J.A., Rubinstein, J.T., Vannier, M.W., Wang, G., Automatic Measurement of the Labyrinth Using Image Registration and a Deformable Inner Ear Atlas, *Academic Radiology*, 10(9), Sept., 2003, pp. 988-999.
23. Hoffman, E.A., Clough, A.V., **Christensen, G.E.**, Lin, C.I., McLennan, G., Reinhardt, J.M., Simon, B.A., Sonka, M., Tawhai, M.H., van Beek, E.J.R., Wang, G. The comprehensive imaging-based analysis of the lung: A forum for team science, *Academic Radiology*, 11(12), Dec., 2004, pp. 1370-1380.
24. Lu, W., Parikh, P., El Naqa, I., Nystrom, M., Hubenschmidt, J., Wahab, S., Mutic, S., Sing, A., **Christensen, G.E.**, Bradley, J.D., Low, D.A., Quantitation of the four-dimensional computed tomography process for lung cancer patients, *Medical Physics*, 32(4), March 2005, pp. 890-901.
25. B.A. Simon, **G.E. Christensen**, D.A. Low, J.M. Reinhardt, Computed Tomography Studies of Lung Mechanics, *Proc Am Thorac Soc*, 2(6), Dec 2005, pp. 506-507, 517-521.
26. **Christensen, G.E.**, Johnson, H.J., Vannier, M.W., Synthesizing Average 3D Anatomical Shapes, *NeuroImage*, 32(1), Aug 2006, pp. 146-158.
27. Owen, B.D., **Christensen, G.E.**, Reinhardt, J.M., Ryken, T.C., Rapid prototype patient specific drill-template for cervical pedicle screw placement. *Computer Aided Surgery*. 2007 12(5):303-8.
28. **Christensen, G.E.**, Song, J.H., Lu, W., El Naqa, I., Low, D.A., Tracking Lung Motion with Inverse Consistent Image Registration. *Med Phys*. June 2007 34(6):2155-63.
29. Reinhardt, J.M., Ding, K., Cao, K., **Christensen, G.E.**, Hoffman, E.A., Bodas, S.V., Registration-based estimates of local lung tissue expansion compared to xenon-CT measures of specific ventilation, *Medical Image Analysis*, Dec 2008, 12:752-763.
30. Li, B., **Christensen, G.E.**, Hoffman, E.A., McLennan, G., Reinhardt, J.M., Pulmonary CT image registration and warping for tracking tissue deformation during the respiratory cycle through 3D consistent image registration, *Med. Phys.* 35(12) Dec 2008, pp. 5575-558.
31. Ryken TC, Owen BD, **Christensen GE**, Reinhardt JM., Image-based drill templates for cervical pedicle screw placement, *J Neurosurg Spine*. 2009 Jan;10(1):21-26.
32. Ryken TC, Kim J, Owen BD, **Christensen GE**, Reinhardt JM., Engineering patient-specific drill templates and bioabsorbable posterior cervical plates: a feasibility study, *J Neurosurg Spine*. 2009 Feb;10(2):129-32.
33. A Klein, J Andersson, BA. Ardekani, J Ashburner, B Avants, MC Chiang, **GE Christensen**, DL Collins, J Gee, P Hellier, JH Song, M Jenkinson, C Lepage, D Rueckert, P Thompson, T Vercauteren, RP Woods, JJ Mann and RV Parsey, Evaluation of 14 nonlinear deformation algorithms applied to human brain MRI registration, *NeuroImage*, Nov. 2009. 46(3): 786-802. doi:10.1016/j.neuroimage.2008.12.037
34. X Geng, GE Christensen, H Gu, TJ Ross, Y Yang, Implicit Reference-Based Group-wise Image Registration and Its Application to Structural and Functional MRI, *NeuroImage*, Available online April 14, 2009, PMID: 19371788.
35. K Ding, JE Bayouth, JM Buatti, **GE Christensen** and JM Reinhardt, 4DCT-Based Measurement of Radiation-Induced Changes in Pulmonary Function, *Medical Physics*, March 2010, 37(3):1261-1272

36. Kumar, D., **Christensen, G.E.**, Geng, X., Hoffman, E.A., BICIR: Boundary-Constrained Inverse Consistent Image Registration Using WEB-Splines. Submitted to IEEE Transactions on Medical Imaging.
37. **Christensen, G.E.**, Geng, X., Kuhl, J.G., Bruss, J., Grabowski, T.J., Pirwani, I.A., Vannier, M.W., Allen, J.S., Damasio, H., Non-Rigid Image Registration Evaluation Project (NIREP) Initiative. Submitted to NeuroImage.

Rigorously Reviewed Conference Papers:

1. **Christensen, G.E.**, Rabbit, R.D., Miller, M.I., Joshi, S.C., Grenander, U., Coogan, T., Van Essen, D.C. Topological properties of smooth anatomic maps. In Bizais, Braillot, and Di Paola, editors, Information Processing in Medical Imaging, Kluwer Academic Publishers, Boston, June 1995, (3) pp. 101-112.
2. **Christensen, G.E.**, Kane, A.A., Marsh, J.L., Vannier, M.W. Synthesis of an Individualized Cranial Atlas with Dysmorphic Shape. IEEE Proceedings of Mathematical Methods in Biomedical Image Analysis, June, 1996, pp. 309-318.
3. Joshi, S.C., Banerjee, A., **Christensen, G.E.**, Csernansky, J.G., Haller, J.W., Miller, M.I., Wang, L. Gaussian Random Fields on Sub-Manifolds for Characterizing Brain Surfaces. In Duncan and Gindi, editors, Information Processing in Medical Imaging, Lecture Notes in Computer Science, vol. 1230, Springer, New York, June, 1997, pp. 381-386.
4. **Christensen, G.E.**, Consistent Linear-Elastic Transformations for Image Matching, Information Processing in Medical Imaging, June, 1999, pp. 224-237.
5. Johnson, H.J., **Christensen, G.E.**, Landmark and Intensity-based, Consistent Thin-Plate Spline Image Registration, In Issana and Leahy, editors, Information Processing in Medical Imaging, Lecture Notes in Computer Science, vol. 2082, Springer, New York, June 2001, pp. 329-343.
6. **Christensen, G.E.**, He, J., Consistent Nonlinear Elastic Image Registration, IEEE Proceedings of Mathematical Methods in Biomedical Image Analysis, Dec., 2001, pp. 37-43.
7. Geng, X., Kumar, D., **Christensen, G.E.**, Vannier, M.W., Inverse Consistent Image Registration of MR Brain Scans: Handedness in Normal Adult Males, In Maintz and Gee, editors, Proceedings of the 2nd International Workshop on Biomedical Image Registration, June 2003, LCNS 2717, Springer-Verlag, Berlin, pp. 71-80.
8. Kumar, D., Geng, X., **Christensen, G.E.**, Vannier, M.W., Characterizing Shape Differences Between Phantom Image Populations Via Multivariate Statistical Analysis of Inverse Consistent Transformations, In Maintz and Gee, editors, Proceedings of the 2nd International Workshop on Biomedical Image Registration, June, 2003, LCNS 2717, Springer-Verlag, Berlin, pp. 367-376.
9. He, J., **Christensen, G.E.**, Large Deformation Inverse Consistent Elastic Image Registration, In Taylor and Noble, editors, Information Processing in Medical Imaging, Lecture Notes in Computer Science, July, 2003, pp. 438-449.
10. Geng, X, Kumar, D, **Christensen, G.E.**, Transitive Inverse-Consistent Manifold Registration, 19th International Conference on Information Processing in Medical Imaging, IPMI 2005, July 11–15 2005, Glenwood Springs, CO. pp. 468-479.
11. Kumar, D., Geng, X., Hoffman, E.A., **Christensen, G.E.**, BICIR: Boundary-Constrained Inverse Consistent Image Registration Using WEB-Splines, Mathematical Methods in Biomedical Image Analysis, June 17-18, 2006 New York City, NY. No page numbers.
12. **Christensen G.E.**, Geng, X., Kuhl, J.G., Bruss, J., Grabowski. T.J., Pirwani, I.A., Vannier, M.W., Allen JS, Damasio H. Introduction to the Non-Rigid Image Registration Evaluation Project

(NIREP), Eds. J. Pluim, B. Likar, and F. Gerritsen, In Third International Workshop on Biomedical Image Registration (WBIR 2006), LNCS 4057, Springer, 9 - 11 July, 2006, Utrecht, The Netherlands. pp 128-135.

13. Reinhardt, J.M., **Christensen, G.E.**, Hoffman, E.A., Ding, K., Cao, K., Registration-derived estimates of local lung expansion as surrogates for regional ventilation, Information Processing in Medical Imaging 2007, July 2-6, 2007 Kerkrade, Netherlands. Lecture Notes in Computer Science LCNS 4584, 2007, pp. 763-774.
14. X Geng, TJ Ross, W Zhan, H Gu, YP Chao, CPo Lin, **GE Christensen**, N Schuff, Y Yang, Diffusion MRI Registration Using Orientation Distribution Functions, Information Processing in Medical Imaging 2009, July 5-10, 2009 Williamsburg, VA. Lecture Notes in Computer Science LCNS 5636, 2009, pp. 626-637.
15. A Tahmasebi, P Abolmaesumi, X Geng, P Morosan, K Amunts, **GE Christensen**, K Zilles, I Johnsruide, A New Approach for Creating Template-free Cytoarchitectonic Probabilistic Maps Using Groupwise Registration, G.-Z. Yang et al. (Eds.): MICCAI 2009, Part I, LNCS 5761, Sept. 2009. Springer-Verlag Berlin Heidelberg, pp. 795–802.
16. K Ding, Y Yin, K Cao, **GE Christensen**, CL Lin, EA Hoffman, JM Reinhardt, Evaluation of Lobar Biomechanics during Respiration using Image Registration, G.-Z. Yang et al. (Eds.): MICCAI 2009, Part I, LNCS 5761, Sept. 2009. Springer-Verlag Berlin Heidelberg, pp. 739–746.
17. K Cao, **GE Christensen**, K Ding, JM Reinhardt, Intensity-and-Landmark-Driven, Inverse Consistent, B-Spline Registration and Analysis for Lung Imagery, Second International Workshop on Pulmonary Image Analysis, MICCAI 2009, Sept., 2009, ISBN-13: 978-1-4486-8089-1, pp. 137-148.
18. Joo Hyun Song, Gary E. Christensen, Jeffrey A. Hawley, Ying Wei, Jon G. Kuhl. Evaluating Image Registration Using NIREP, Accepted Workshop on Biomedical Image Registration WBIR 2010.
19. Kunlin Cao Kai Ding, Gary E. Christensen, Madhavan L Raghavan, Ryan Amelon, and Joseph M. Reinhardt, Unifying Vascular Information in Intensity-Based Nonrigid Lung CT Image Registration, Accepted Workshop on Biomedical Image Registration WBIR 2010.
- 20.

7.3 Articles, chapters, abstracts, and summaries in research monographs, conference/symposium/ congress proceedings, handbooks, etc. (Generally most articles published in the cited media. Also papers printed by a society as a preprint/reprint and not published in any other form.)

Conference Papers and Book Chapters:

1. Morely, R.E., **Christensen, G.E.**, Sullivan, T.J., Kamin, O. The design of a bit-serial coprocessor to perform multiplication and division on a massively parallel architecture. *Frontiers of Massively Parallel Computation*, IEEE Computer Society Press, Washington, October, 1988, pp. 419-422.
2. Morely, R.E., **Christensen, G.E.**, Sullivan, T.J. The design of a bit-serial coprocessor to perform multiplication and division on a massively parallel architecture. *Systolic Array Processors*, Prentice Hall, New York, 1989, pp. 497-503.
3. **Christensen, G.E.**, Rabbit, R.D., Miller, M.I. A deformable neuroanatomy textbook based on viscous fluid mechanics. Invited paper. In Prince and Runolfsson, editors, *Proceedings of the 1993 Conference on Information Sciences and Systems*, Johns Hopkins University, March 24-26, 1993, pp. 211-216.

4. **Christensen, G.E.**, Miller, M.I., Vannier, M.W. A 3D deformable magnetic resonance textbook based on elasticity. Proceedings of the American Association for Artificial Intelligence, 1994 Spring Symposium: Applications of Computer Vision in Medical Image Processing, Stanford University, March 21-23, 1994, pp. 153-156.
5. Haller, J.W., **Christensen, G.E.**, Miller, M.I., Gado, M., McKeel, D., Csernansky, J., Vannier, M.W. A comparison of automated and manual segmentation of hippocampus MR images. Image Processing, Loew, editor, Proceedings SPIE 2434, 1995, pp. 206-215.
6. Haller, J.W., **Christensen, G.E.**, Joshi, S.C., Gado, M., Miller, M.I., Vannier, M.W. Precision and accuracy of a high dimensional transformation and segmentation of MR images of the hippocampus. In Bizais, Braillot, and Di Paola, editors, Information Processing in Medical Imaging, Kluwer Academic Publishers, Boston, 1995, (3) pp. 401-402.
7. **Christensen, G.E.**, Miller, M.I., Marsh, J.L., Vannier, M.W. Automatic Analysis of Medical Images Using a Deformable Textbook. Computer Assisted Radiology, Lemke, Inamura, Jaffe, and Vannier, editors, Springer Verlag, Berlin, June, 1995, pp. 146-151.
8. Haller, J.W., **Christensen, G.E.**, Joshi, S.C., Miller, M.I., Vannier, M.W. Digital Atlas-based Segmentation of the Hippocampus. Computer Assisted Radiology, Lemke, Inamura, Jaffe, and Vannier, editors, Springer Verlag, Berlin, June, 1995, pp. 152-157.
9. Rabbitt, R.D., Wiess, J.A., **Christensen, G.E.**, Mapping Inter-subject Variations in Tissue Geometry. ASME Summer Bioengineering Conference, Beaver Creek, Colorado, June, 1995.
10. Joshi, S.C., Miller, M.I., **Christensen, G.E.**, Coogan, T., Grenander, U. The generalized Dirichlet problem for mapping brain manifolds. Vision Geometry IV, Proceedings of SPIE 2573, Eds. Melter, Wu, Bookstein, and Green, July, 1995, pp. 278-289.
11. Rabbitt, R.D., Wiess, J., **Christensen, G.E.**, Miller, M.I. Mapping of hyperelastic deformable templates. Proceedings of SPIE's 1995 Geometric Methods in Applied Imaging, San Diego, California, July 9-14, 1995.
12. Banerjee, A., **Christensen, G.E.**, Haller, J.W., Joshi, S.C., Raichle, M.E., Miller, M.I. Accommodating Anatomical Variability in Functional Imaging Via Deformable Templates. Proceedings of the thirty-third Annual Allerton Conference on Communication, Control, and Computing, University of Illinois, Champaign-Urbana, Illinois, October, 1995.
13. Marsh, J.L., Kane, A.A., Lo, L.J., **Christensen, G.E.**, Vannier, M.W., Craniofacial Imaging: The relationship between soft and hard tissues in hemifacial microsomia. Proceedings of the 6th International Congress of Craniofacial Surgery, Saint Tropez, French Riviera, October 21-24, 1995.
14. **Christensen, G.E.**, Kane, A.A., Marsh, J.L., Vannier, M.W. A 3D Deformable Infant CT Atlas, CAR '96: Computer Assisted Radiology, eds. Lemke, H.U., Vannier, M.W., Inamura, K., and Farman A.G., Elsevier, New York, June, 1996, pp. 847-852.
15. Kane, A.A., Lo, L.J., Marsh, J.L., **Christensen, G.E.**, Vannier, M.W. Craniofacial Imaging: The relationship between bone and muscles of mastication in hemifacial microsomia. CAR '96: Computer Assisted Radiology, eds. Lemke, H.U., Vannier, M.W., Inamura, K., and Farman A.G., Elsevier, New York, June, 1996, pp. 837-840.
16. **Christensen, G.E.**, Marsh, J.L. Vannier, M.W., Computer Simulation of "Normalcy" in Craniosynostosis, Computer Assisted Radiology and Surgery, Lemke, Vannier, and Inamura editors, Elsevier Science, Berlin, June, 1997, pp. 739-743.
17. **Christensen, G.E.**, Williamson, J.F., Chao, K.S.C., Miller, M.I., So, F.B., Vannier, M.W. Deformable Anatomical Templates for Brachytherapy Treatment Planning in Radiotherapy of

- Cervical Cancer, Vision Geometry VI, Proceedings of the SPIE 3168, Eds. Melter, Wu, and Latecki, July, 1997, pp. 147-154.
18. Miller, M.I., Joshi S.C., **Christensen, G.E.**, Large Deformation Fluid Diffeomorphisms For Landmark and Image Matching, In Toga editor, Brain Warping, Academic Press, San Diego, 1999, pp. 115-132.
 19. **Christensen, G.E.**, Joshi S.C., Miller, M.I., Bayesian Framework for Image Registration Using Eigenfunctions, In Toga editor, Brain Warping, Academic Press, San Diego, 1999, pp. 85-100.
 20. **Christensen, G.E.**, Johnson, H.J., Haller, J.W., Melloy, J., Vannier, M.W., Marsh, J.L., Synthesizing average 3D anatomical shapes using deformable templates, Medical Imaging 1999: Image Processing, Hanson editor, Proceedings of the SPIE vol. 3661, 1999, pp. 574-582.
 21. **Christensen, G.E.**, Johnson, H.J., Darvann, T., Hermann, N., Marsh, J.L., Midsagittal surface measurement of the head: an assessment of craniofacial asymmetry, Medical Imaging 1999: Image Processing, Hanson editor, Proceedings of the SPIE vol. 3661, 1999, pp. 612-619.
 22. Johnson, H.J., **Christensen, G.E.**, Marsh, J.L., Vannier, M.W., Validation of probabilistic anatomical shape atlases, Medical Imaging 2000: Image Processing, Hanson editor, Proceedings of the SPIE vol. 3979, 2000, pp. 687-697.
 23. **Christensen, G.E.**, Yin, P., Vannier, M.W., Chao, K.S.C., Dempsey, J.F., Williamson, J.F., Large-Deformation Image Registration using Fluid Landmarks, 4th IEEE Southwest Symposium on Image Analysis and Interpretation, IEEE Computer Society, 2000, pp. 269-273.
 24. Williamson, J.F., Yin, P., **Christensen, G.E.**, Dempsey, J.F., Bennet, H., Chao, K.S.C., Grigsby, P.W., Nguyen, K., Vannier, M.W.: A Deformable Template Approach to Registration of Serial CT Studies for Dose Planning in Intracavitary Brachytherapy. Proceedings of the XIII-th International Congress of Computers in Radiotherapy, 22-25 May, 2000, Heidelberg, Germany, ed. by W. Schlegel and T. Bortfield, Springer-Verlag, Berlin, pp.90-92.
 25. Carlson, B.L., **Christensen, G.E.**, Johnson, H.J., Vannier, M.W., Evaluating template bias when synthesizing population averages, Medical Imaging 2001: Image Processing, eds. M. Sonka and K. Hanson, Proceedings of SPIE Vol. 4322, part 2, 2001, pp. 527-536.
 26. He, J., **Christensen, G.E.**, Rubinstein, J.T., Wang, G. A New Method for Consistent Nonlinear Image Registration, Medical Imaging 2002: Image Processing, eds. M. Sonka and J.M. Fitzpatrick, Proceedings of SPIE Vol. 4684, 2002, pp. 945-954.
 27. Li, B., **Christensen, G.E.**, Dill, J.A., Hoffman, E.A., Reinhardt, J.M., 3-D inter-subject warping and registration of pulmonary CT images for a human lung model, Medical Imaging 2002: Image Processing, eds. A.V. Clough and C.T. Chen, Proceedings of the SPIE vol. 4683, 2002, pp. 324-335.
 28. El Naqa, I.M., Low, D.A., **Christensen, G.E.**, Parikha, P.J., Song, J., Nystroma, M.M., Lua, W., Deasya, J.O., Hubenschmidta, J.P., Wahaba, S.H., Mutica S., Singha, A.K., Bradleya, J.D. Automated 4-D Lung Computed Tomography Reconstruction During Free Breathing for Conformal Radiation Therapy, Medical Imaging 2004: Image Processing. SPIE Vol. 5369, pp. 100-106.
 29. Christensen, G.E., Inverse consistent registration with object boundary constraints, Proc. IEEE Intl. Symp. Biomedical Imaging, April, 2004, pp. 591-594.
 30. Low, D.A., Parikh, P.J., El Naqa, I.M., Nystrom, M.M., Lu W., Hubenschmidt, J.P., Wahab, S.H., Mutic, S., Singh, A.K., **Christensen, G.E.**, Bradley, J.D., Quantitative 4-D CT Using a Multislice CT Scanner, ICCR 2004.

31. **Christensen, G.E.** Song, J., El Naqa, I.M., Lu W., Low, D.A. Tracking Lung Motion: Correlating Inverse Consistent Image Registration and Spirometry, ICCR 2004.
32. Pan, Y., Kumar, D., Hoffman, E.A., **Christensen, G.E.**, McLennan, G., Song, J.H., Ross, A., Simon, B.A., Reinhardt, J.M. Regional lung expansion via 3D image registration. Medical Imaging 2005: Image Processing, eds. J.M. Fitzpatrick and J.M. Reinhardt, Proceedings of SPIE Vol. 5747, 2005.
33. **Christensen, G.E.**, Inverse Consistent Image Registration, In Handbook of Biomedical Image Analysis, Volume III Registration Models, eds. J.S. Suri, D.L. Wilson, and S. Laxminarayan, Kluwer Academic/Plenum Publishers, New York, 2005. pp. 219-250.
34. Lu, W., Song J.H., **Christensen, G.E.**, Parikh, P.J., Bradley, J.D., Low, D.A., Modeling lung motion using consistent image registration in four dimensional computed tomography for radiation therapy. Medical Imaging 2006: Image Processing, eds. J.M. Reinhardt, J.P.W. Pluim, Proc. of SPIE Vol. 6144, 61442L, (2006).
35. de Ryk, J., Weydert, J., **Christensen, G.E.**, Thiesse, J., Namati, E, Reinhardt, J.M., Hoffman, E.A., McLennan, G., Three dimensional histopathology of lung cancer with multimodality image registration. Medical Imaging 2007: Proc. of SPIE, vol. 6512. San Diego, CA. February 17-22, 2007.
36. Saha, P.K., Zhang, H., Sonka, M., **Christensen, G.E.**, Rajapakse, C.S., Active Index Model: A Unique Approach for Regional Quantitative Morphometry in Longitudinal and Transverse Studies, SPIE Medical Imaging 2007: Proc. of SPIE, vol. 6512. San Diego, CA. February 17-22, 2007.
37. K Ding, K Cao, SV Bodas, **GE Christensen**, EA Hoffman, JM Reinhardt, Registration-based lung tissue mechanics assessment during tidal breathing, First International Workshop on Pulmonary Imaging, Eds. M Brown, M de Bruijne, B van Ginneken, A Kiraly, JM Kuhnigk, C Lorenz, K Mori, JM Reinhardt, 2008, pp 63-72.
38. K. Ding, K. Cao, **G. E. Christensen**, E. A. Hoffman, and J. M. Reinhardt. Registration-based regional lung mechanical analysis: Retrospectively reconstructed dynamic imaging versus static breath-hold image acquisition. In X. P. Hu and A. V. Clough, eds., Proc. SPIE Conf. Medical Imaging, vol. 7262, Lake Buena Vista, FL, 2009.
39. Gary E. Christensen, Nathan E. Burnette, Weichen Gao, Matineh Shaker, Joseph M. Reinhardt, Janice E. Cook-Granroth, Geoffrey McLennan, Eric A. Hoffman. Human Airway Tree Structure Query Atlas Proc. SPIE, Vol. 7626, 762611 (2010); doi:10.1117/12.844596.
40. Ying Wei, Gary E. Christensen, Joo Hyun Song, David Rudrauf, Joel Bruss, Jon G. Kuhl, Thomas J. Grabowski, Evaluation of Five Non-rigid Image Registration Algorithms Using the NIREP Framework, Proc. SPIE, Vol. 7623, 76232L (2010); doi:10.1117/12.844616.
41. Kunlin Cao, Kai Ding, Gary E. Christensen, Joseph M. Reinhardt. Tissue Volume and Vesselness Measure Preserving Nonrigid Registration of Lung CT Images, Proc. SPIE, Vol. 7623, 762309 (2010); doi:10.1117/12.844541.

Abstracts:

1. **Christensen, G.E.**, Miller, M.I., Amit, Y, Grenander, U. Global shape models for anatomical structures. In Poor and Schwartz, editors, Proceedings of the 26th Conference on Information Sciences and Systems, Princeton University, March 18-20, 1992. p. 356.
2. **Christensen, G.E.**, Individualized Electronic Craniofacial Textbooks, The 52nd Annual Meeting of American Cleft Palate-Craniofacial Association, April, 1995. Abstract.

3. Kane, A.A., Eaton, A., **Christensen, G.E.**, Vannier, M.W., Kreiberg, S., Zonneveld, F.W. Marsh, J.L. Qualification of Midface Dysmorphology in Untreated Unicoronal Synostosis, Plastic Surgery Research Council, New Orleans, LA, June, 1996. Abstract.
4. **Christensen, G.E.**, Kane, A.A., Marsh, J.L. Vannier, M.W. Individualizing Electronic Atlases for Dysmorphic Craniofacial Shape Analysis, Plastic Surgery Research Council, New Orleans, LA, June, 1996. Abstract.
5. **Christensen, G.E.**, Kane, A.A., Marsh, J.L., Vannier, M.W. Individualized Electronic Atlases for Dysmorphic Craniofacial Shape Analysis. 41st Plastic Surgery Research Council Annual Meeting, St. Louis, MO, June 1-4, 1996. Abstract.
6. Haller, J.W., Banerjee, A., **Christensen, G.E.**, Snyder, A.Z., Miller, M.I., Raichle, M.E. High Dimensional Transformation of PET and MRI to Atlas Space. 2nd International Conference on Functional Mapping of the Human Brain, Boston, MA, June 17-21, 1996. Abstract.
7. Marsh, J.L., **Christensen, G.E.**, Kane, A.A., So, F.B., Vannier, M.W., A 3D Deformable Infant CT Atlas for Surgical Planning, The 54th Annual Meeting of American Cleft Palate-Craniofacial Association, April, 1997. Abstract.
8. Marsh, J.L., Lee, B.C.P., Kane, A.A., Kim, Y.O., **Christensen, G.E.**, Gado, M.G., Kido, D.K., Francel, P.C. Koby, M., Brain Topographic Dysmorphology in Non-syndromic Craniosynostosis, The 54th Annual Meeting of American Cleft Palate-Craniofacial Association, April, 1997. Abstract.
9. Bucholz, R.D., **Christensen, G.E.**, Josh, S.C., Levy, A.L., Miller, M.I. Smith, K.R., A Patient-Specific Deformable Brain Atlas with Integration into a Surgical Navigation System, Abstract, The American Association of Neurological Surgeons 1997 Annual Meeting, Minneapolis, MN, April, 1997. Abstract.
10. **Christensen, G.E.** Marsh, J.L., Computer Simulation of "Normalcy" in Craniosynostosis, Abstract, American Association of Plastic Surgeons, 1997 Annual Meeting, Atlantic Beach, FL, May, 1997. Abstract.
11. Williamson, J.F., **Christensen, G.E.**, Chao, C.K.S., Miller, M.I., So, F.B., Vannier, M.I., A Novel Method for Registration of 3D CT Images with and without Intracavitary Applicators for Definitive Radiotherapy of Cervix Carcinoma. 9th Annual Meeting of American Brachytherapy Society, Palm Beach, FL. May, 1997. Abstract.
12. Bucholz, R.D., Levy, A.L., **Christensen, G.E.**, Frank, K.J., Hammoud, A., Henderson, J.M., Joshi, S.C., McDurmont, L.L., Mark, K.E., Miller, M.I., Schaewe, T.J., Smith, K.R., Sturm, C.D., An Internet-Connected, Patient-Specific, Deformable Brain Atlas Integrated into a Surgical Navigation System, ICNS 97, 1997. Abstract.
13. Vannier, M.W. **Christensen, G.E.**, Electronic Anatomic Atlases for Medical Imaging, Short Course, American Association of Physicists in Medicine, 39th Annual Meeting and Exhibition, Milwaukee, WI, July, 1997. Abstract.
14. **Christensen, G.E.**, Modeling of Cranial Dysmorphology and Its Correction by Global Pattern Matching, Abstract, The Whitaker Foundation Biomedical Engineering Research Grants Conference, Snowbird, UT, July, 1997. Abstract.
15. **Christensen, G.E.**, Modeling Cranial Dysmorphology and Its Correction Using Pattern Theory, The Whitaker Foundation Annual Meeting, San Diego, CA, Aug., 1999. Abstract.
16. Lu, W., Parikh, P., Hubenschmidt, J., Nystrom, M., **Christensen, G.E.**, Song, J, Bradley, J., Low, D., A 4D CT process using respiratory amplitude sorting and consistent image registration,

Biomedical Research Opportunities Workshop IV, February 24-25, 2006 at the Bethesda North Marriott Hotel & Conference Center. Abstract.

17. Ryken, T.C., Owen, B.D., Reinhardt, J.M.; **Christensen, G.E.**, Rapid Prototype Patient-Specific Drill Templates for Cervical Pedicle Screw Placement, 2006 AANS Annual Meeting, April 22-27, 2006, San Francisco, CA. Abstract.
18. Kaczka, D.W., Kumar, D., **Christensen, G.E.**, Massa, C.B., Simon, B.A., Assessment of Regional Mechanics in Acute Lung Injury using 3D Image Registration, In American Thoracic Society International Conference, ATS 2006, San Diego, May 19-24, 2006. Abstract.
19. Lu, W., Song, J.H., **Christensen, G.E.**, Parikh, P.J., Zhao, T., Hubenschmidt, J.P., Bradley, J.D., Low, D.A., Evaluating Lung Motion Variations In Repeated 4D CT Studies Using Inverse Consistent Image Registration, 48th Annual meeting of the American Society for Therapeutic Radiology and Oncology (ASTRO) Nov. 5-9, 2006, Philadelphia, Pennsylvania Abstract.
20. Monroe, W., Xiaodong, W, Kim, Y., Bayouth, J.E., Waldron, T.J., Siochi, R.A.C., McGuire, S.M. **Christensen, G.E.**, Using Small-Deformation Linear-Elastic Registration to Quantifying Ventilation-Competent Lung Imaging from Clinical 4DCT Datasets: Toward Selective Avoidance IMRT for Locally Advanced Non-Small-Cell Lung Cancer. ASTRO 2008. Abstract submitted.
21. Geng, X., **Christensen, G.E.**, et al. Effect of Inter-Subject Registration on Group Analysis of Diffusion Tensor Imaging, ISMRM 16th Annual Meeting, which will be held in Toronto, Ontario, Canada, 3 – 9 May 2008. Abstract submitted.
22. Gu, H, Geng, X., Stein, E.A., Yang, Y., **Christensen, G.E.**, Application of Inter-Subject Nonlinear Registration to Group Analysis of Resting-State Functional MRI, ISMRM 16th Annual Meeting, which will be held in Toronto, Ontario, Canada, 3 – 9 May 2008. Abstract submitted.
23. Alford, S.K., Fuld, M.K., Lamm, W.JE., Robertson, H.T., Song, J.H., **Christensen, G.E.**, Hoffman, E.A. (2008). Regional pulmonary perfusion measurements via dynamic axial MDCT and fluorescent microspheres. 2008 American Thoracic Society International Conference, May 16-21 in Toronto, Ontario, Canada, (ATS 2008). Abstract.
24. Fuld, M.K., Alford, S.K., Lamm, W.JE., Robertson, H.T., Song, J.H., **Christensen, G.E.**, Hoffman, E.A. (2008). Comparison of functional imaging techniques: Xenon CT & microspheres. 2008 American Thoracic Society International Conference, May 16-21 in Toronto, Ontario, Canada, (ATS 2008). Abstract.
25. Chon, D., Song, J.H., Vasilescu, D.M., Shi, L., Sieren, J., **Christensen, G.E.**, Reinhardt, J.M., McLennan, G., Hoffman, E.A. (2008). Age-dependent changes in regional lung compliance in mice using MicroCT. 2008 American Thoracic Society International Conference, May 16-21 in Toronto, Ontario, Canada, (ATS 2008). Abstract.
42. Chon, D., Song, J.H., Vasilescu, D.M., Cao, K., Hudson, M.A., **Christensen, G.E.**, McLennan, G., Hoffman, E.A. (2008). Regional lung expansion in supine vs prone mice and sheep studied by micro or multidetector row CT. 2008 American Thoracic Society International Conference, May 16-21 in Toronto, Ontario, Canada, (ATS 2008). Abstract.
43. K Cao, K Ding, ML Raghavan, **GE Christensen**, EA Hoffman, JM Reinhardt, Registration-Based Estimates of Lung Tissue Strain in Supine Sheep, International Summit on the Future of Quantitative and Functional Lung Imaging, 2008. Abstract.
26. K Ding, K Cao, **GE Christensen**, ML Raghavan, EA Hoffman, JM Reinhardt, Registration-based lung tissue mechanics assessment during tidal breathing, International Summit on the Future of Quantitative and Functional Lung Imaging, 2008. Abstract.

27. K Cao, K Ding, ML. Raghavan, **GE Christensen**, EA Hoffman, JM Reinhardt, Estimation of in vivo strain distribution in the lungs, Proceedings of the BMES Annual Meeting, 2008. Abstract.
28. DW Kaczka, K Cao, GE Christensen, JHT Bates, and BA Simon, Regional Mechanics in Acute Lung Injury: A Comparison of Function and Structure, American Thoracic Society International Conference, May 15-20, San Diego, (ATS 2009). Abstract.
29. R Amelon, K Ding, K Cao, G.E. Christensen, J.M. Reinhardt, M.L. Raghavan, Comparison Of Regional Lung Deformation Between Dynamic And Static CT Imagery Using Inverse Consistent Registration, 2009 ASME Summer Bioengineering Conference, Lake Tahoe, CA, June 17-21, 2009. Abstract.
30. Ryan Amelon, Kai Ding, Kunlin Cao, Gary E. Christensen, Joseph M. Reinhardt, Madhavan Raghavan. A Novel Method of Characterizing Regional Lung Deformation. Proceedings of the ASME 2010 Summer Bioengineering Conference (SBC2010) June 16-19, Grande Beach Resort, Naples Florida, USA Abstract.
31. Yichao Wang, Ford Sleeman, Cheng Zhang, Gary E. Christensen, Elisabeth Weiss, Jeffery F. Williamson, Quantitative evaluation and optimization of an algorithm for non-rigidly registering serial CT images to the planning CT during prostate-cancer radiation therapy. AAPM 2010 Abstract.

7.4 Articles published in popular journals or journals with moderate review procedures or presented at a meeting and for which the society or organization does not provide a permanent printed version of article.

7.4.1 Posters

1. **Christensen, G.E.**, Rabbit, R.D., Miller, M.I. 3D brain mapping using a deformable neuroanatomy. 1993 International Meeting on Fully Three-Dimensional Image Reconstruction, Snowbird, Utah, June 1993. Poster.
2. Haller, J.W., **Christensen, G.E.**, Joshi, S., Miller, M.I., Gado, M., Csernansky, J., Vannier, M.W. MRI segmentation using high dimensional transformations of a digital atlas. American College of Neuropsychopharmacology (ACNP) Conference, Dec 11-16, 1994. San Juan, Puerto Rico. Poster.
3. Haller, J.W., **Christensen, G.E.**, Joshi, S.C., Gado, M., Vannier, M.W. Precision and accuracy of a high dimensional transformation and segmentation of MR images of the hippocampus. Proceedings of the 16th International Conference on Information Processing in Medical Imaging, Brest, France, June 26-30, 1995. Poster.
4. **Christensen, G.E.**, Kane, A.A., Marsh, J.L., Vannier, M.W. Individualized Electronic Atlases for Dysmorphic Craniofacial Shape Analysis. 41st Plastic Surgery Research Council Annual Meeting, St. Louis, MO, June 1-4, 1996. Poster.
5. Kane, A.A., Eaton, A., **Christensen, G.E.**, Marsh, J.L., Vannier, M.W., Kreiberg, S., Zonneveld, F.W. Qualification of Midface Dysmorphology in Untreated Unicoronal Synostosis. 41st Plastic Surgery Research Council Annual Meeting, St. Louis, MO, June 1-4, 1996. Poster.
6. Haller, J.W., Banerjee, A., **Christensen, G.E.**, Snyder, A.Z., Miller, M.I., Raichle, M.E. High Dimensional Transformation of PET and MRI to Atlas Space. 2nd International Conference on Functional Mapping of the Human Brain, Boston, MA, June 17-21, 1996. Poster.
7. **Christensen, G.E.**, Joshi, S.C., Miller, M.I. Individualizing Anatomical Atlases of the Head, Proceedings of the 4th International Conference on Visualization in Biomedical Computing, Hamburg, Germany, Sept 22-25, 1996. Poster.

8. Joshi, S.C., Banerjee, A., **Christensen, G.E.**, Csernansky, J.G., Haller, J.W., Miller, M.I., Wang, L. Gaussian Random Fields on Sub-Manifolds for Characterizing Brain Surfaces. In Duncan and Gindi, editors, Information Processing in Medical Imaging, Poultney, VT, June, 1997. Poster.
9. Kane, A.A., Eaton, A., **Christensen, G.E.**, Vannier, M.W., Kreiberg, S., Zonneveld, F.W., Marsh, J.L. Qualification of Midface Dymorphology in Untreated Unicoronal Synostosis, Plastic Surgery Research Council, New Orleans, LA, June, 1996. Poster.
10. Johnson, H.J, **Christensen, G.E.**, Haller, J.W., Melloy, J., and Vannier, M.W. Synthesizing Average 3D Anatomical Shapes. Symposium on Cardiovascular Imaging, Iowa City, IA, Sept., 1998. Poster.
11. **Christensen, G.E.**, Modeling Cranial Dymorphology and Its Correction Using Pattern Theory, The Whitaker Foundation Annual Meeting, San Diego, CA, Aug., 1999. Poster.
12. He, J., **Christensen, G.E.**, Rubinstein, J.T., Wang, G. A New Method for Consistent Nonlinear Image Registration, Medical Imaging 2002: Image Processing, San Diego, CA, Feb., 2002. Poster.
13. Kumar, D., Geng, X., **Christensen, G.E.**, Vannier, M.W., Characterizing Shape Differences Between Phantom Image Populations Via Multivariate Statistical Analysis of Inverse Consistent Transformations, 2nd International Workshop on Biomedical Image Registration, Philadelphia, PA, June, 2003, Poster.
14. Lu, W., Parikh, P., Hubenschmidt, J., Nystrom, M., **Christensen, G.E.**, Song, J., Bradley, J., Low, D., A 4D CT process using respiratory amplitude sorting and consistent image registration, Biomedical Research Opportunities Workshop IV, February 24 - 25, 2006 at the Bethesda North Marriott Hotel & Conference Center. Poster.
15. de Ryk, J., Weydert, J., **Christensen, G.E.**, Thiesse, J., Namati, E, Reinhardt, J.M., Hoffman, E.A., McLennan, G., Three dimensional histopathology of lung cancer with multimodality image registration. Medical Imaging 2007: Proc. of SPIE. Poster

7.5 Other Technical publications (book and paper reviews, reports, theses, and dissertations).

1. **Christensen, G.E.** The design of a bit-serial coprocessor to perform multiplication and division on a massively parallel architecture. Electrical Engineering Masters Thesis, Washington University, St. Louis, December 1989.
2. **Christensen, G.E.** Deformable shape models for anatomy. Electrical Engineering D.Sc. Dissertation, Washington University, St. Louis, Missouri, August, 1994.
3. **Christensen, G.E.**, Joshi, S.C., Wang, J. Miller, M.I. Deformable Brains. April, 1994. Videotape.
4. **Christensen, G.E.**, Haller, J.W., Walkup, R. Pathophysiology of Schizophrenia, February, 1995. Videotape.

7.6 Journal, publishers and research supporting agencies for whom you have reviewed papers, books or proposals in the past three years.

IEEE Transactions on Medical Imaging, IEEE Transactions on Image Processing, Medical Image Analysis, Pattern Recognition Letters, Radiology, The Whitaker Foundation, Applied Mathematics Letters, Visualization in Biomedical Computing Conference 1996, IEEE Computer, National Science Foundation, National Institute of Health, The University of Iowa Biosciences Initiative Pilot Grant Program, The University of Iowa Carver Scientific Research

Initiative Grant Program, Medical Physics, Oxford University Press, IEEE Transactions on Pattern Analysis and Machine Intelligence, Computer Vision and Image Understanding, International Workshop on Biomedical Image Registration.

7.7 Patents

1. Miller, M.I., **Christensen, G.E.**, Joshi, S.C., Grenander, U., Method and Apparatus for Image Registration, United States, patent number **6,009,212**. Issued 12/28/99.
2. Miller, M.I., Joshi, S.C., **Christensen, G.E.** Rapid Convolution Based Large Deformation Image Matching Via Landmark and Volume Imagery. United States, patent number **6,226,418**. Issued 5/1/01.
3. Miller, M.I., Joshi, S.C., **Christensen, G.E.** Rapid Convolution Based Large Deformation Image Matching Via Landmark and Volume Imagery. United States, patent number **6,408,107**. Issued 6/18/02.
4. **Christensen, G.E.** Method and Apparatus for Generating Consistent Image Registration. United States, patent number **6,611,615**. Issued 8/26/03.