

RAMIN SHAHIDI

LAST UPADTED 9/2009

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Stanford:

Stanford University Medical School
300 Pasteur Dr.,
Stanford, CA 94305

CICAS:

Cal Institute of Computer Assisted Surgery
502 Palm Ave, Suite A
Los altos, CA 94022

Education:

1995 Ph.D., Rutgers University & University of Medicine and Dentistry of NJ.
Biomedical Engineering -- Biomedical Imaging & Biomedical Sciences
Thesis Volumetric image-based surgical navigation via the surgical microscope.

1990 M.S., Rutgers University & UMDNJ--University of Medicine and Dentistry of NJ.
Biomedical Engineering -- Bio-Instrumentation & Bio-Materials
Thesis Computer Based Molecular Modeling of Collagen Autogenesis.

1987 B.S., Cum Laude, Boston University, Boston, MA
Biomedical Engineering -- Bio-Instrumentation & Bio-Mechanics

Awards:

1991

UMDNJ Fellowship Award, Dept. of Radiology, University of Medicine & Dentistry of NJ

1988

UMDNJ Scholars Award, BioMed. Engg. Dept., University of Medicine & Dentistry of NJ

Scientific Membership:

Since 2001

Reviewing Committee, National Science Foundation (*ERC*)

Since 2000

Reviewing Committee, National Institute of Health (*NCI, NLHI and CSR*)

Since 1999

Reviewing Committee, Med. Img. Comp. & Comp. Asst. Interventions (*MICCAI*)

Since 2007

Board of Directors, International Foundation of Computer Aided Radiology and Surgery (*IFCARS*)

Since 2005

Deputy Editor, International Journal of Computer Assisted Radiology and Surgery (*JCARS*)

Since 2002

Board of Directors, International Society of Computer Assisted Surgery (*ISCAS*)

Since 2000

Organizing Committee, Computer Aided Radiology and Surgery (*CARS*)

Since 1997

Organizing Committee, Medicine Meets Virtual Reality Conferences (*MMVR*)

Since 1996

Editorial Board, Journal of Computer Assisted Surgery (*JCAS*)

Patents:

Issued Dec'00

6,167,296

Method and Apparatus for Volumetric Image Navigation

Issued Aug'02

6,442,417

Method and Apparatus for Transforming View Orientation

Issued Mar'02

6,511,418

Apparatus and Method for Calibrating an Endoscope

Issued Mar'03

6,529,758

Method and Apparatus for Volumetric Image Navigation

Issued Sep'03

6,591,130

Method of Image-Enhanced Endoscopy at the Patient Site

Issued Dec'03

6,674,883

Virtual Fluoroscopic System and Method

Issued Aug'04

6,782,287

Method for tracking a med. instrument based on image registration

Issued Feb'05

6,850,794

Endoscopic Targeting Method and System

Pending

20010029333

Method and Apparatus for Volumetric Image Navigation

Pending

20010025183

Method and Apparatus for Maintaining a Trajectory in Stereotaxi

Pending

20010037064

Method and Apparatus for Maintaining a Trajectory in Stereotaxi

Pending

20030032878

Method and Apparatus for volumetric Image Navigation

Pending

60/513,157

Method for intraoperative Dynamic Image-based Targeting

Pending

60/513,158

Method for intraoperative Ultrasonic targeting

Honors:

2005

World's Top 100 People in Medical Imaging, Health Imaging

2002

Medical Design Excellence Award, MDN, Winner 2002

Professional Experience:

2006 - Present Managing Director, California Institute of Computer-Assisted Surgery, (CICAS)

2006 - Present Associate Professor of Surgery, Stanford University School of Medicine

2003 - Present Associate Professor of Electrical Engineering, Stanford University

California Institute of Computer-Assisted Surgery (CICAS) was founded by Ramin Shahidi in 2005, as a non-profit organization, where he has been working as its full time managing director, while maintaining his academic position at Stanford University. Since 2005, Shahidi's research efforts and his IP at Stanford have been transitioned to this private research center in an effort to facilitate the transfer of technology from Stanford to the industry. CICAS's Mission is to bridge the gap between biomedical sciences and industrial models, in hopes of developing novel ideas, which, in turn, would directly result in advances in health care.

7/96 - 9/06. Director, Image Guidance Laboratories, Stanford University School of Medicine

7/96 - 9/05. Research Assistant Professor of Neurosurgery, Stanford University School of Medicine

9/00 - 9/06 Research Assistant Professor of Surgery, Stanford University School of Medicine

9/00 - 9/05. Assistant Professor of Electrical Engineering (courtesy), Stanford University

Recruited to establish and direct the Image Guidance Laboratories (IGL) for the Neurosurgery Department (and later Surgery and Electrical Engineering) at Stanford University School of Medicine. Since then research efforts focused toward developing a software infrastructure for fast volumetric image rendering for surgical planning and navigation, from which many other novel projects (such as Volumetric Image Enhanced Endoscopy and Microscopy) have spun off. Using such techniques, the surgeon visualizes the surgical site, while exploring the inner layers of the patient anatomy - not visible by the surgeon - from the volumetrically reconstructed images acquired from either MRI or CT. This project (the first of its kind) was licensed by Stanford in 1999 to CBYON, Inc. Today, IGL has been recognized as one of the centers of excellence in the country in the field of surgical planning and navigation with over 100 peer-reviewed articles published. Current research projects at IGL include 3D ultrasonic image guidance for soft tissue biopsies and intraoperative image fusion for surgical navigation.

2/05 - 3/06. Application Design Consultant, General Electric, IDX, Burlington VT

In charge of creating full system design specs for the Company's next generation 3D radiology platform, along with strategizing for expansion of IDX-PACS products into the surgical PACS market.

2/04—2/05 Application Design Consultant, AMICAS, Inc., Boston, MA

In charge of creating full design and engineering specs along with strategizing for next generation of AMICAS' vertical markets in applications such as cardiology, orthopedics, 3D radiology, pathology, and surgical PACS.

2/01 - 2/03 CTO and VP Product Design, CBYON, Inc., Palo Alto, CA

2/99 - 2/03 Director and Chair, Clinical Advisory Board, CBYON, Inc., Palo Alto, CA

Scientific Founder, Director, and Chief of Clinical Advisory Board, later Chief Technical Officer and Vice President of Product Design for this \$30MM venture-backed startup developer and manufacturer of CBYON Suite, an FDA-cleared advanced surgical visualization and navigation system sold commercially and used successfully in over 5000 complex cases in over 40 locations internationally. The system's advanced protocol-based user interface facilitates the effective utilization of 3D images during surgery with minimal user input. CBYON "Doctor Station", a volumetric visualization software with analysis and patient reporting capabilities, was also introduced by the company for 3D diagnostic and surgical planning applications. Responsible for all aspects of CBYON's imaging protocols, hardware design and software design (from features, to workflow and user interface, and inventor of 12 of 14 US patents licensed exclusively from Stanford University. CBYON was sold privately to General Electric in January of 2004.

2/96 - 7/96 Program Manager Vital Images Inc., Plymouth, MN

2/95 - 2/96 Imaging Scientist, Vital Images Inc., Plymouth, MN

Upon completion of doctorate research, joined this leading developer of 3D diagnostic radiology and surgical planning software. Principally responsible for designing new 3D imaging protocols and clinical applications in collaboration with leading radiologists at Duke University, Stanford University, and the Hospitals of University of Pennsylvania (HUP). The 3-D imaging protocols included the entire workflow from acquisition to specific rendering parameters for volumetric diagnosis and treatment planning. Also an early key contributor to the design of Vitrea, Vital Images' product for 3D Radiology, which has been the best selling imaging software during the last decade.

Selected publications: (from over 100 invited papers, book chapter, proceedings, and journals)

- Rosahl SK, **Shahidi R**, The Virtual Operative Field, how image Guidance can become integral to microneurosurgery, in "Samii's Essentials in Neurosurgery" Springer 2009
- Gharabaghi A, Rosahl SK, Feigl GC, Safavi-Abbasi S, Mirzayan JM, Heckl S, **Shahidi R**, Tatagiba M, Samii M "Image-guided lateral suboccipital approach: part 2-impact on complication rates and operation times." *Neurosurgery* 2008; 62: 3 Suppl 1: 24-9; discussion 29
- Gharabaghi A, Rosahl SK, Feigl GC, Liebig T, Mirzayan JM, Heckl S, **Shahidi R**, Tatagiba M, Samii M "Image-guided lateral suboccipital approach: part 1-individualized landmarks for surgical planning." *Neurosurgery* 2008; 62: 3 Suppl 1: 18-22; discussion 22-3
- Gharabaghi A, Rosahl SK, Feigl GC, Samii A, Liebig T, Heckl S, Mirzayan JM, Safavi-Abbasi S, Koerbel A, Löwenheim H, Nägele T, **Shahidi R**, Samii M, Tatagiba M "Surgical planning for retrosigmoid craniotomies improved by 3D computed tomography venography." *Eur J Surg Oncol* 2007;
- Rosahl SK, Gharabaghi A, Hubbe U, **Shahidi R**, Samii M "Virtual reality augmentation in skull base surgery." *Skull Base* 2006; 16: 2: 59-66
- Hummel J, Figl M, Birkfellner W, Bax MR, **Shahidi R**, Maurer CR, Bergmann H "Evaluation of a new electromagnetic tracking system using a standardized assessment protocol." *Phys Med Biol* 2006; 51: 10: N205-10
- Hummel JB, MR, Figl ML, Maurer C, Birkfellner WW, Bergmann H, Kang Yan, **Shahidi R** "Design and Application of a Standardized Assessment Protocol for Electromagnetic Tracking Systems" *Medical Physics* 2005; Accepted:
- Hummel JB, Bax MR, Figl ML, Kang Y, Maurer C, Birkfellner WW, Bergmann H, **Shahidi R** "Design and application of an assessment protocol for electromagnetic tracking systems." *Med Phys* 2005; 32: 7: 2371-9
- Russakoff DB, Rohlfing T, **Shahidi R**, Adler Jr JR, "Intensity-based 2D-3D image registration incorporating a single fiducial marker" *Academic Radiology* 2005; Accepted:
- Gharabaghi A, Hellwig D, Rosahl SK, **Shahidi R**, Schrader C, Freund HJ, Samii M "Volumetric image guidance for motor cortex stimulation: integration of three-dimensional cortical anatomy and functional imaging." *Neurosurgery* 2005; 57: 1 Suppl: 114-20; discussion 114-20
- Russakoff DB, Rohlfing T, **Shahidi R**, Kim D, Adler J "Intensity based 2D-3D spine registration incorporating one fiducial marker" *Medical Image Computing and Computer-Assisted Intervention* 2003; 287-294
- Bax MR, Khadem R, Johnson JA, Wilkinson EP, **Shahidi R** "Calibration and accuracy testing for image-enhanced endoscopy." *Stud Health Technol Inform* 2002; 85: 52-6
- Jannin P, Fitzpatrick JM, Hawkes DJ, Pennec X, **Shahidi R**, Vannier MW "Validation of medical image processing in image-guided therapy." *IEEE Trans Med Imaging* 2002; 21: 12: 1445-9
- **Shahidi R**, Bax MR, Maurer CR, Johnson JA, Wilkinson EP, Wang B, West JB, Citardi MJ, Manwaring KH, Khadem R "Implementation, calibration and accuracy testing of an image-enhanced endoscopy system." *IEEE Trans Med Imaging* 2002; 21: 12: 1524-35
- Hariri S, Abbasi HR, Chin S, Steinberg G, **Shahidi R** "Quantification of the gravity-dependent change in the C-arm image center for image compensation in fluoroscopic spinal neuronavigation." *Stud Health Technol Inform* 2001; 81: 177-9
- Abbasi HR, Grzeszczuk R, Chin S, Fahrig R, Holz H, Hariri S, Kim D, Adler J, **Shahidi R** "Clinical fluoroscopic fiducial-based registration of the vertebral body in spinal neuronavigation." *Stud Health Technol Inform* 2001; 81: 1-7

- **Shahidi R**, Clarke L, Bucholz RD, Fuchs H, Kikinis R, Robb RA, Vannier MW "White paper: challenges and opportunities in computer-assisted interventions January 2001." *Comput Aided Surg* 2001; 6: 3: 176-81
- Abbasi HR, Hariri S, Martin D, **Shahidi R** "A comparative statistical analysis of neuronavigation systems in a clinical setting." *Stud Health Technol Inform* 2001; 81: 11-7
- **Shahidi R**, "Introduction" *Comput Aided Surg* 2000; 5: 2: 81
- Khadem R, Yeh CC, Sadeghi-Tehrani M, Bax MR, Johnson JA, Welch JN, Wilkinson EP, **Shahidi R** "Comparative tracking error analysis of five different optical tracking systems." *Comput Aided Surg* 2000; 5: 2: 98-107
- Wilkinson EP, **Shahidi R**, Wang B, Martin DP, Adler JR, Steinberg GK "Remote-rendered 3D CT angiography (3DCTA) as an intraoperative aid in cerebrovascular neurosurgery." *Comput Aided Surg* 1999; 4: 5: 256-63
- **Shahidi R**, Tombropoulos R, Grzeszczuk R "Clinical Applications of Three-Dimensional Rendering of Medical Data-Sets" *Journal of "Proceedings of IEEE* 1998; 86: 3: 555-568
- **Shahidi R**, Wang B, Epitoux M, Adler J, Grzeszczuk R "Volumetric Image Navigation through Stereotactic Endoscopes" *Medical Image Computing and Computer-Assisted Intervention (MICCAI)* 1998; 241-252
- **Shahidi R**, Argiro V, Napel S, Gray L, McAdams P, Rubin G, Beaulieu C, Jeffrey B, Johnson A "Several Virtual Endoscopy Techniques using CT and Perspective Volume Rendering" *Visualization in BioMedical Computing (VBC)* 1996; 521-528
- **Shahidi R**, Mezrich R, Silver D "Proposed simulation of volumetric image navigation using a surgical microscope." *J Image Guid Surg* 1995; 1: 5: 249-65
- Mezrich R, Negin S, **Shahidi R**, Taylor H, Knight S "Functional Segmentation for Breast Display" *Journal of Magnetic Resonance* 1993;

Invited Lectures (6 out of over 120 invited lectures and scientific presentations)

Shahidi R (Keynote Speaker), "Evolution of Interactive 3-D Image-Based Surgical Visualization", **World Congress on Medical Physics and Biomedical Engineering**, Seoul Korea, Aug 2006

Shahidi R: "Volumetric Surgical Navigation via Stereotactic Endoscopy", Intl. Seminars in Neurosurgery, **International Neuroscience Institute**, Hanover Germany, June 2003

Shahidi R: "Integration of Volumetric Surgical Navigation Systems", Seminars in Biomedical Imaging, **Mayo Clinic**, Rochester, MN, February 2003

Shahidi R: "Validation of Volumetric Surgical Navigation Systems", Image Guided Interventions **National Institute of Health, NCI-NIBIB and NSF**, Bethesda, Maryland, Sep 2002

Shahidi R: (Keynote Speaker), "Challenges and Opportunities in Computer Assisted Surgery", **International Conference on Mechatronics**, Linz, Austria, July 2002

Shahidi R: (Endnote Speaker) "The next step in Computer Assisted Therapy," **CARS-ISCAS-2000 International Congress of Computer Assisted Radiology and Surgery**, San Francisco, CA, June 2000

In News: (6 out of 35 media reports)

CBS-TV: News at 11: "Technology by Sue Kwon, Separation of Egyptian Twins", October 21, 2003

Wired Magazine: "Til' Death Do US Apart, Separation of Iranian Twins", October 2003

Tech-TV, "National Medical Technology Coverage, UCLA Twins", September 23-30, 2002

MIT Technology Review, "Review Surgeons see into their patients", May 25, 2001

ABC News, "Technology Update – Transparent Patients", February 18 2001

PBS, American Medical Review, "Frontiers in Medical Technology", November 2000