William M. Wells III

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Name William M. Wells III

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Place of Birth
Albuquerque, New Mexico

Education 1976 B.S. University of California at Santa Cruz

1984 M.S. Stanford University (Computer Science)

1993 Ph.D. Massachusetts Institute of Technology (Computer Science)

Postdoctoral Training
1992 – 1994 Research Fellow, Medical Image Processing, Segmentation and Surgical Visualization, Department of Radiology, Brigham and Women's Hospital, Boston

1993 – 1994 Postdoctoral Researcher in Computer Vision, MIT AI Laboratory, Boston

Academic Appointments
1993 – 1994 Research Fellow, Harvard Medical School, Boston

1994 – Instructor in Radiology, Harvard Medical School, Boston

1994 – Research Scientist, EECS Dept., MIT, Boston

1997 – Assistant Professor, Harvard Medical School, Boston

Hospital Appointments
1993 – 1994 Research Fellow in Radiology, Brigham and Women's Hospital, Boston

1994 – Research Associate in Radiology, Brigham and Women's Hospital, Boston

Awards and Honors

1976, University of California at Santa Cruz, Honors in the Major, Physics, Thesis: "Photons in a Refractive Medium"

1995, Runner up, Marr Prize, International Conference on Computer Vision

Memberships, Offices and Committee Assignments in Professional Societies

1984 – IEEE

1986 – 1988, 1995, 1996 Papers Refereed, *IEEE Trans. Pattern Anal. Mach. Intell.*

1987, 1993 Papers Refereed, *IEEE International Conference on Robotics and Automation*

1993 Papers Refereed, *IEEE Transactions on Robotics and Automation*

1994,1995 Papers Refereed, *IEEE Transactions on Medical Imaging*

1995, 1996 Papers Refereed, *Medical Image Analysis*

1994 Program Committee Chair, *AAAI Spring Symposium Series, Stanford CA: Applications of Computer Vision in Medical Image Processing*

1994 – 1995 Program Committee, *First International Conference on Computer Vision, Virtual Reality and Robotics in Medicine, Nice, France*

1995 Program Committee, *IEEE–SIAM Workshop on Mathematical Methods in Biomedical Image Analysis*

1996 – Editorial Board, *Medical Image Analysis, Oxford University Press*

1996 Program Committee, *First Joint Conference, CVRMed II and MRCAS III, Grenoble, France*

1997 Co-Chair, Program Committee, *First Conference on Medical Image Analysis, Visualization, and Robotics, Boston, MA (planned for October 1998)*

Major Research Interests

Medical Image Processing

Computer Assisted Surgery

Computer Vision

Research Funding Information

1995 – 1998 NIH/PO1(Jolesz), Co-PI

To improve an existing infrastructure (scientific, medical, and technical) to support a coordinated multifocused, multidisciplinary development of MRI used with intervertional procedures in some well-defined areas.

1997 – 2000 Whitaker Biomedical Engineering Research Grant, PI

To develop tools and capabilities that will enhance the exploitation of the anatomic and functional information available in medical imagery for use in image-guided therapy and diagnosis.

Patents

"Absolute Distance Sensor", with C. Gillard and N. Buholz. *U.S. Patent No. 4,611,915* 1986.

"Correction of Magnetic Resonance Imager Intensity Inhomogeneities by using Tissue Properties", with R. Kikinis. *Patent Pending 1996.*

"System and Method of Registration of Three-Dimensional Data Sets", with G. Ettinger, R. Kikinis, W.E.L. Grimson, T. Lozano-Pérez and S. White, *Patent Pending 1995.*

SELF REPORT of TEACHING

Regional, National, or International Contributions

1990 "MAP Model Matching", Division of Applied Sciences, Harvard University.

1991 "MAP Recognition", Seminar on Visual Information Processing, MIT.

1991 "Normal-Uniform Mixture Models and Scale-Based Continuation in Image Restoration and Recognition", Working Group on Optimization, Harvard University.

1992 "Statistical Object Recognition", Robotics Seminar, Harvard University.

1993 "Introduction to Unix Workstations", Oral Biology 609, Harvard School of Dental Medicine.

1993 "Statistical Gain Correction and Segmentation of MRI data", Seminar on Visual Information Processing, MIT.

1993 "Statistical Gain Correction and Segmentation of MRI data", Computer Science Department, University of North Carolina, Chapel Hill.

1993 “Statistical Gain Correction and Segmentation of MRI data”, Salk Institute, La Jolla, CA.

1994 “Medical Applications of Computer Vision”, IBM T.J. Watson Research Laboratory, Hawthorne, NY.

1994 “Medical Applications of Computer Vision”, Computer Science Department, Columbia University.

1994 “Medical Applications of Computer Vision”, Computer Science Department, Carnegie Mellon University.

1994 “Adaptive Segmentation and Intensity Correction of MRI data” *SMR Interventional MRI Workshop.*

1994 “Adaptive Segmentation and Intensity Correction of MRI data”, Institut National de Recherche en Informatique et en Automatique, Sophia Antipolis, France.

1995 “Multi-Modal Volume Registration by Maximization of Mutual Information” Institut National de Recherche en Informatique et en Automatique, Sophia Antipolis, France.

1995 “Multi-Modal Registration by Maximization of Mutual Information” Computer Science Department, Yale University.

1996 “Medical Image Exploitation”, Informatics Dept., University of Nurmberg-Erlangen, Germany.

1996 “Multi-Modal Volume Registration by Maximization of Mutual Information”, KFA PET Center, Jeulich Germany.

1996 “Medical Image Exploitation”, NEC Research Laboratories, Princeton, NJ.

1996 “Adaptive Segmentation and Intensity Correction of MRI data”, Mitsubishi Electric Research Laboratories, Cambridge, MA.

1997 “Structure and Interpretation of Computer Programs”, MIT, Cambridge, MA.

Original Reports

1. Wells WM. Efficient synthesis of gaussian filters by cascaded uniform filters. *IEEE Trans. Pattern Anal. Mach. Intell.* 1986;8:234–239.

2. Wells WM. Visual estimation of 3-d line segments from motion – a mobile robot vision system. *IEEE Trans. on Robotics and Automation* 1989;5:820-825.

3. Flynn AM, Brooks RA, Wells WM, Barrett DS. Intelligence for miniature robots. *Sensors and Actuators* 1989;20:187-196.

4. Grimson WEL, Lozano-Pérez T, Wells WM, Ettinger GJ, White SJ, Kikinis R. An automatic registration method for frameless stereotaxy, image guided surgery, and enhanced reality visualization. *IEEE Transactions on Medical Imaging.* 1996;15:126–141.

5. Wells WM, Kikinis R, Grimson WEL, Jolesz F. Adaptive segmentation of MRI data. *IEEE Transactions on Medical Imaging.* 1996;15:429–442.

6. Viola P, Wells WM. Alignment by maximization of mutual information. *International Journal of Computer Vision.*

7. Wells WM, Viola P, Atsumi H, Nakajima S, Kikinis R. Multi-modal volume registration by maximization of mutual information. *Medical Image Analysis.* 1996;1:35–52.

8. Kapur T, Grimson WEL, Wells WM, Kikinis R. Segmentation of brain tissue from magnetic resonance images. *Medical Image Analysis.* 1996;1:109–128.

9. Wells W. Statistical approaches to feature-based object recognition. *International Journal of Computer Vision.* 1997;21:63–98.

10. W. Grimson, G. Ettinger, T. Kapur, M. Leventon, W. Wells, R. Kikinis. Utilizing Segmented MRI Data in Image-Guided Surgery. *Int. J. Pat. Recog. and Artif. Intell., V8 N 11, (1977). Accepted.*

11. K. Held, E. Rota Kopps, B. Krause, W. Wells, R. Kikinis, H. Muller-Gartner. Markov Random Field Segmentation of Brain MR Images. *IEEE Transactions on Medical Imaging (1997). Accepted.*

Proceedings of Meetings

1. Wells W. Visual estimation of 3-d line segments from motion – a mobile robot vision system. In:*Proc. Sixth National Conf. on A.I.*, Los Altos:Morgan Kaufmann 1987.

2. Flynn AM, Brooks AM, Wells WM, Barrett DS. The world's largest one cubic inch robot. In: *Proc. 2nd. IEEE Conf. on Micro Electro Mechanical Systems*, Piscataway, NJ: IEEE, 1988:98–101.

3. Menon M, Wells WM. Massively parallel image restoration. In: *Proceedings of the International Joint Conference on Neural Networks*, San Diego, CA: IEEE, 1990.

4. Wells WM. A statistical approach to model matching. In: *Proceedings of the SPIE Symposium on Advances in Intelligent Systems*, SPIE (Bellingham Wash), 1990.

5. Wells WM. MAP model matching. In: *Proceedings of the IEEE Computer Society Conference on Computer Vision and Pattern Recognition*, Lahaina, Maui, HI:IEEE, 1991.

6. Wells WM. Posterior marginal pose estimation. In: *Proceedings of the Image Understanding Workshop*, Menlo Park, CA: Morgan Kaufman, 1992.

7. Wells WM. Statistical object recognition with the expectation-maximization algorithm in range-derived features. In: *Proceedings of the Image Understanding Workshop*, Menlo Park, CA: Morgan Kaufman, 1993.

8. Wells WM, Kikinis R, Grimson W, Jolesz F. In-vivo intensity correction and segmentation of magnetic resonance image data. In: *Technical Report, AAAI Spring Symposium on Applications of Computer Vision in Medical Image Processing*, 1994.

9. Grimson WEL, Lozano-Pérez T, Wells WM, Ettinger, GJ, White SJ, Kikinis R. An automatic registration method for frameless stereotaxy, image guided surgery, and enhanced reality visualization. In: *Proceedings of the IEEE Computer Society Conference on Computer Vision and Pattern Recognition*, Seattle, WA: IEEE 1994.

10. Ettinger G, Grimson WEL, Lozano-Pérez T, Wells WM, White SJ, Kikinis R. Automatic registration for multiple sclerosis change detection. In: *Proceedings of the IEEE Workshop on Biomedical Image Analysis, Seattle, WA: IEEE 1994.*

11. Grimson WEL, Lozano-Pérez T., Wells WM, Ettinger GJ, White S, Kikinis R. Automated registration for enhanced reality visualization in surgery.

In: *Proceedings of the First International Symposium on Medical Robotics and Computer Assisted Surgery, Pittsburgh, PA 1994.*

12. Wells WM, Kikinis R, Grimson WEL, Jolesz F. Statistical intensity correction and segmentation of magnetic resonance image data. In: *Proceedings of the third conference on Visualization in Biomedical Computing*, Rochester MINN:SPIE 1994.

13. Kikinis R, Gleason PL, Lorensen W, Wells WM, Grimson WEL, Lozano-Pérez T, Ettinger GJ, White SJ, Jolesz F. Image guidance techniques for neurosurgery. In: *Proceedings of the third conference on Visualization in Biomedical Computing*, Rochester MINN:SPIE 1994.

14. Wells WM, Kikinis R, Grimson WEL, Jolesz F. Adaptive segmentation of MRI data. In: *Proceedings of the First International Conference on Computer Vision, Virtual Reality and Robotics in Medicine, Nice, France 1994.*

15. Grimson W, Ettinger GJ, White SJ, Gleason PL, Lozano-Pérez T, Wells WM, Kikinis R. Evaluting and validating an automated registration system for enhanced reality visualization in surgery. In: *Proceedings of the First International Conference on Computer Vision, Virtual Reality and Robotics in Medicine, Nice, France 1994.*

16. Baker J, Wells WM. Multiresolution statistical object recognition. In: *Proceedings of the Image Understanding Workshop*, Menlo Park, CA: Morgan Kaufman, 1995.

17. Viola P, Wells WM. Alignment by maximization of mutual information. In: *Proceedings of the Fifth International Conference on Computer Vision, IEEE:1995.*

18. Wells WM, Viola P, Kikinis R. Multi-modal volume registration by maximization of mutual information. In: *Proceedings of the Second International Symposium on Medical Robotics and Computer Assisted Surgery, 1995.*

19. Hata N, Wells WM, Halle M, Nakajima S, Viola P, Kikinis R, Jolesz F. Image guided microscopic surgery system using mutual-information based registration. In: *Proceedings of the Fourth Conference on Visualization in Biomedical Computing, Hamburg, Germany.* Springer Verlag:1996:317–326.

20. Berger JW, Leventon ME, Hata N, Wells WM, Kikinis R. Design considerations for a computer-vision-enabled ophthalmic augmented reality environment. In: *Proceedings of the First Joint Conference on CVRMed II and MRCAS III, Grenoble, France. Springer Verlag:1997*

21. T. Kapur, P. Beardsley, S. Gibson, W. Grimson, W. Wells. Model Based Segmentation of Clinical Knee MRI. In: *Proceedings of the IEEE Intl. Workshop on Model-Based 3D Image Analysis, Bombay, India 1998. Accepted.*

Books and Monographs

1. Wells WM. Statistical Object Recognition [Dissertation]. Cambridge, Massachusetts: MIT, 1992. 177 pp.