

Vita : George C. Stockman (Jan 2007)

Professor, Computer Science and Engineering Department
Michigan State University
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Education

Ph.D. Computer Science, The Univ. of Maryland, 1977

M.S. in Computer Science, Penn State University, 1971

MAT, Math Ed, Harvard Univ., 1967

BS, Math Ed, E. Stroudsburg Univ., 1966

Professional Experience

Professor (7/90 to present), Department of Computer Science and Engineering, Michigan State University; *Acting Chair* (Jan 2000 to Aug 2001); *Associate Chair* (Aug 2005 to present).

Partner and Director of Information Technology (8/2000 to 12/2004) ERL,LLC, a company doing seating design, ergonomics, and biomechanic evaluation, primarily for the auto industry. This business relationship was terminated as of 2 Jan 2005.

Sabbatical 2/97 to 8/97 University of Washington: Computer Sci. Dept. and Electrical Eng. Dept., Seattle, WA

Sabbatical 6/88 to 6/89, Texas Instruments, Dallas, TX

Associate Professor (9/82 to 6/90), Department of Computer Science, Michigan State University

Associate Professor (9/79 to 5/82), The American Univ., Washington, DC

Senior Research Scientist (73 to 82), LNK CORP., Silver Spring, MD

Math Instructor (6/68 to 6/70) Virginia Union Univ., Richmond, VA

Expertise and Interests

Professional interests and expertise include computer vision, particularly object representation and recognition, artificial intelligence, computer graphics, data structures and algorithms. Recent research work has been focused in two areas: (1) human face modeling and related to identification, augmented reality and tele-presence, and (2) analysis and visualization of 3D volume images. Recent research at the university includes work on the development of two image analysis systems that are in use today, one for the analysis of images of plant roots and one for making measurements of the human body in the driver's seat of an automobile. Current projects include a commercial prototype to verify identity using a 3D scanner and stored face model, software to share for the visualization and analysis of 3D volumes, and methods to produce real time face-to-face video telecommunication by blending video from two cameras in an HMD.

Selected Projects

The following projects are selected as examples the breadth of experience and background: more information can be obtained from my web pages or from the listed publications.

1. Modeling and Recognizing Human Faces, for telecommunication, man-machine interaction, and identification: 3DID and face2face.
2. Analysis and display of 3D volume images for materials and medical research.
3. Creation of a virtual animal organs for veterinary student education.
4. Measuring Human Body Pose in an Automobile for research on comfort and safety.
5. Extraction of Root Measurements from Underground Images for research on plants and soil.
6. Determining Pose of 3D Objects with Curved Surfaces for general object recognition and automation.

Work in industry

Work with ERL,LLC involved doing seating design, ergonomics, and biomechanic evaluation, primarily for the auto industry. ERL,LLC has proprietary human body models and modeling software that is used early in the auto design process to optimize comfort, task control, and safety. My responsibilities, in addition to participating in setting overall company direction, included direction of software development, and in particular, graphics and algorithm development.

Previous work with LNK CORP included development of algorithms and software for image analysis, computer cartography, and database software for indexing and searching text. In the cartographic work, tasks spanned the gamut from extracting map features from photographs to storing and indexing map features. In working with the document data bases, we were responsible for maintaining an inverted file system for the National Institute on Drug Abuse which was the forerunner of STAIRS (IBM). While working with LNK Corporation, I was involved in all aspects of development of medium size production software systems from winning contract bids, through design and implementation and to eventual installation and maintenance.

Programming and Systems

Extensive programming in the past was done in FORTRAN and in COMMON LISP. Most recent programming has been done in C++ and OpenGL. Recent environments used are UNIX on Sun and SGI platforms and some PC/Windows. MATLAB on PCs.

Book

L. Shapiro and G. Stockman, **Computer Vision**, Prentice-Hall Inc. (January 2001) ISBN 0-13-030796-3, 580 pages; see web pages for samples. (Russian translation by Boguslavsky and Sokolovs.)

Book Chapters

1. G. Stockman, *Object Representation for Recognition by Alignment*, in **3D Object Representations in Computer Vision**, J. Ponce and M. Herbert(eds), Springer-Verlag(1995). Also in NSF/ARPA Workshop on 3D Object Representations in Computer Vision, New York, NY (Dec 5-7,1994),

2. G. Stockman, *Object Recognition and Localization via Pose Clustering*, in **Computer Vision : Advances and Applications** R. Kasturi and R. Jain (Eds), IEEE Computer Society Press (1991).
3. G. Stockman, *Object Recognition*, in **Interpretation of Range Images**, R. Jain and A. Jain (Eds), Springer-Verlag (1989).
4. G. Stockman, *Feature Extraction using Structured Light*, in **Real-time Object Measurement and Classification**, A. Jain (Ed), Springer-Verlag (1988)
5. G. Stockman, *Three-dimensional Pose Computations from Multiple Views*, in **Pattern Recognition in Practice II**, E.S. Gelsema and L.N. Kanal Eds, North Holland (1986)
6. G. Stockman, *Waveform Parsing Systems*, **Handbook of Statistics, Vol. 2, Classification, Pattern Recognition and Reduction of Dimensionality**, Krishniah and Kanal(eds.), North Holland, (1982), Chap. 24.
7. G. Stockman and L. Kanal, *Interactive Screening of Reconnaissance Imagery*, **Pattern Recognition and Artificial Intelligence**, C.H. Chen (Ed) Academic Press, N.Y., 1976.
8. G. Stockman, *Object Detection via Image Registration*, in **Pattern Recognition in Practice**, North Holland (1980) pp. 75-85, (E. Gelsema and L. Kanal, Ed.).

Selected Publications

1. Dirk Colbry and George Stockman, *Identity Verification via the 3DID Face Alignment System*, Proceedings of WACV 2007 (21 Feb 2007) Austin, TX.
2. Miguel Figueroa and George Stockman, *Super Resolution Face View Synthesis using a Mobile Face Capture System*, Int. Conf. on Image Processing (review poster presentation), session WA-P7, Atlanta, GA (9-12 Oct 2006).
3. Silviu Minut and George Stockman, *Interpolation Snakes for Border Detection in Noisy Images*, Proc. Int. Conf. on Computer Vision Theory and Applications, Setubal, Portugal (25-28 Feb 2006).
4. G. Stockman, J. Payne, J. Saddler, D. Colbry, *Error measurement and analysis for a 3D face surface matching system*, Sensor Journal, (2006) 26, 2 :116-121.
5. Dirk Colbry, George Stockman, and Anil Jain, *Detection of Anchor Points for 3D Face Verification*, In IEEE Workshop on Advanced 3D Imaging for Safety and Security A3DISS San Diego California, June 2005.
6. George Stockman, Computing Fundamentals for IT and IS Programs, Proceedings of the ASEE Annual Conference, (June 2005) Portland, OR, Session 3620.
7. Miguel Figueroa, F. Biocca, C. Reddy, J. Rolland, G. Stockman, Providing High Social Presence for Mobile Systems via an Unobtrusive Face Capture System, Proc. 8th International Workshop on Presence, (Sept. 2005) London, UK.
8. P. Albee and George Stockman, Interest Points from the Radial Mass Transform, Proceedings of IEEE International Conference on Acoustics, Speech, and Signal Processing, (March 2005) Philadelphia, PA .
9. Unsang Park, Lalitha Udpa, George Stockman, *Motion-based Filtering of magneto-optic images*, Image and Vision Computing, 22-3 (2004).
10. G. Stockman, P. Albee, L. Dillon, and J. Oleszkiewicz, *Programing Exams for Assessing Learning and Teaching*, Proc. ASEE National Conf. (June 2004) Salt Lake City, Utah.
11. C. Reddy, G. Stockman, J. Rolland and F. Biocca, *Mobile Face Capture for Virtual Face Videos*, poster and proceedings, Face Processing in Video Workshop, IEEE-CVPR, Washington, D.C. (June 2004).
12. D. Colbry, X. Lu, A. Jain, and G. Stockman, *Integrating Range and Texture Information for 3D Face Recognition*, IEEE Int. Conf. on Automatic Face and Gesture Recognition, Grenoble, FR (March 2004).

13. Biocca, F., Rolland, J., Owen, C., Stockman, G., Mou, W., Harms, C., Tang, A., Plantagenest, G., Reddy, C., Hua, H. *Approaches to the Design and Measurement of Social and Information Awareness in Augmented Reality Systems*, Proc. of HCI International, (22-27 June 2003) Crete, Greece
14. Unsang Park, L. Udpa, G. Stockman, W. Shih, and J. Fitzpatrick, *Real-time implementation of motion-based filtering in a magneto-optic imager*, 30th Annual Review of Progress in Quantitative Nondestructive Evaluation, (29 July - 1 Aug, 2003) Green Bay, WI
15. Albee, P and Stockman, G. *Tools for the analysis and visualization of material volumes*, live demo session and 2-page summary in the proceedings, IEEE Conf. on Computer Vision and Pattern Recognition, Madison, WI (June 2003)
16. J. Chun and G. Stockman, *Subband Image Segmentation Using VQ for Content Based Image Retrieval*, ACM Multimedia 2001 (30Sep-5Oct, 2001) Ottawa, Ontario, Canada.
17. G. Stockman and R. Enbody, *Teaching Advanced Students C++ with Computer Vision*, Proc. Workshop on Combined Research-Curriculum Development in Computer Vision, CVPR 2001 (9-14 Dec) Kauai, Hawaii
18. V. Bakic and G. Stockman, *Menu Selection by Facial Aspect*, Proc. Vision Interface '99, Quebec Canada (18-21 May 99).
19. Jin-Long Chen and George Stockman, *3D Free-Form Object Recognition Using Indexing by Contour Features*, Computer Vision and Image Understanding, Vol. 71, No. 3 (Sep 98)334-355.
20. G.C. Lee and G. Stockman, *Detection of object wings in fused range and intensity imagery*, Pattern Recognition Journal, vol. 31, No. 2 (Feb 98)137- 158.
21. G. Stockman and J.L. Chen and Y. Cui and H. Reynolds, *Measuring Body Points on Automobile Drivers using Multiple Cameras*, Image and Vision Computing, vol. 15, no. 4 (April 97) 317-329.
22. S-W. Chen, G. Stockman, C.Y. Dai and C.P. Chuang, *Two-stage Dynamic Deformation for Construction of 3D Models*, Graphical Models and Image Processing, Vol. 58, No. 5, (Sep 96)484-493.
23. J.L. Chen and G. Stockman, *Determining Pose of 3D Objects with Curved Surfaces*, IEEE-PAMI Vol. 18 No. 1 (Jan 1996)57-62.
24. G.C. Stockman, *A Minimax Algorithm Better than Alpha-Beta*, Artificial Intelligence, Vol. 12, (1979)177-196.
25. D. Ra and G. Stockman, *Integrated Natural Language Parsing Based on Interleaved Semantic Processing*, Proc. of the Second Int. Symposium on Artificial Intelligence, Monterrey, Mexico (23-27 Oct 1989).
26. D. Ra and G. Stockman, *Use of Knowledge for Word Sense Disambiguation*, Proceedings of the Annual Conf. of the Int. Assoc. of Knowledge Engineers, College Park, MD, (June 1989).
27. P. Ballard and G. Stockman, *Controlling a Computer via Facial Aspect*, IEEE-Trans-SMC April 95
28. Q. Huang and G. Stockman, *Model-based Recognition of Blood Vessels from MR Images*, Proc. First World Congress on Computational Medicine, Public Health, and Biotechnology, Austin, TX, 1994. Also in review by IEEE-Trans on Medical Imaging.
29. J.L. Chen and G. Stockman, *Recovering and Tracking Pose of Curved 3D Objects from 2D Images*, Proc. Int. Conf. Computer Vision and Pattern Recognition (CVPR) NY (June 15-17, 1993)233-239
30. Q. Huang and G. Stockman, *Generalized Tube Model: Recognizing 3D Elongated Objects from 2D Intensity Images*, Proc. Int. Conf. Computer Vision and Pattern Recognition (CVPR) NY (June 15-17, 1993)104-109
31. G. Stockman, *Object Recognition and Localization via Pose Clustering*, Computer Vision Graphics and Image Processing, Vol 40(1987)361-387.
32. G.Hu and G.Stockman, *3-D Surface Solution Using Structured Light and Constraint Propagation*, IEEE-TPAMI-11-4 (Apr89)390-402.

33. G. Stockman, G. Lee and S.W. Chen, *Reconstructing Line Drawings from Wings : the Polygonal Case*, in Proc. of ICCV 3, Osaka, Japan, (3-7 Dec 1990)
34. J. Miller and G. Stockman, *The Number of Linear Extensions in a Precedence Graph*, Proc 1990 IEEE Conf. on Robotics and Automation, Cincinnati, OH (13-18 May 1990)
35. G. Lee and G. Stockman, *Detecting wings in quadric surface scenes*, Applications of Artificial Intell. X, SPIE Proc. Vol. 1708, (22-24 Apr 1992), Orlando FL
36. N. Shrikhande and G. Stockman, *Surface Orientation from a Projected Grid*, IEEE-TPAMI-11-4(June 1989)650-655.

Professional Activities and Service

Memberships/Service in Professional Organizations

- A. Goshtasby, G. Stockman, and K. Rohr, *Workshop: 2-D and 3-D Image Registration*, to be presented Sunday, June 27, at the 2004 IEEE Int. Conf. on CVPR, in Washington, D.C.
- ASEE/CAC Program Evaluator 2003
- ASEE/CAC Program Evaluator 2005
- ASEE/CAC Program Evaluator 2006
- Member American Society for Engineering Education (ASEE)
- Senior Member, IEEE and member of PAMI Technical Committee
- Distinguished IEEE Lecturer 1990-1993
- Intelligent Systems Focus Group (former Chair), IEEE/ACM Curriculum 2001

Reviewing and Editorial Work

- Associate Editor, Pattern Recognition, 1988-present
- Editor for Special Issue on CAD-based CV for journal CVIU 1997.
- Editor for Special Issue on CV Education for journal IJAIPR 1997.
- Reviewer for IEEE Trans. on Pattern Analysis and Machine Intelligence
- Reviewer for IEEE Trans. on Systems, Man, and Cybernetics
- Reviewer for Computer Vision and Image Understanding
- occasional reviewer for other journals

Organizational Service to Conferences

- Program Committee for IASTED Int. Conf., Marabella, SP (Sep 2004)
- Program Committee for IASTED Int. Conf., Benidorm, SP (Sep 2005)
- Program Committee for 2004 SNPDC Conf., Beijing, China
- Program Committee for 2002 Int. Conf. on Pattern Recognition (ICPR)
- General Chair for ASEE North Central Section Conference 2000.
- Program committee: Indian Comp. Vision, Graphics, and Image Proc. Conf., Oct 2000
- Co-Organizer of Workshop at international CVPR conf., Hilton Head, June 2000
- Program committee member for IEEE/RSJ IROS'97 Conference.
- Organized Panel for CVPR 97: Computer Vision Education
- Program committee member for CVPR 1994,96,98,99
- Organized Panel for CVPR 94: The Role of Computer Vision in Multimedia

- Organized Panel for CVPR 96: Computer Vision Education
- Organized Workshop for CVPR 97: Computer Vision Education
- Reviewer for IEEE Conf. on Computer Vision and Pattern Recognition (CVPR)
- Session organizer for SPIE Spring Conference 1991
- Panelist for CAD-based Computer Vision Workshop, Feb 1994
- Reviewer for International Joint Conf. on Pattern Recognition (ICPR)
- Session chair for ICPR, SMC, and AI conferences
- Gave tutorial session at ICPR in Miami (1980)
- Panelist at U.S.-France Joint Seminar on Inspection (Aug 1983)
- Panelist in Expert Systems tutorial at WMU (Dec 1985)
- Organized session on 3D vision at Oakland Univ. AI Conf. (Apr 1986)
- Participant and session chair in NATO workshop (Aug 1987)
- Session Chair for NSF Workshop on Range Data (Mar 1988)
- Local arrangements committee for International Joint Conf. on Artificial Intelligence, Detroit (Aug 1989)
- Program CoChair for IEEE Workshop on Interpretation of 3D Scenes, Austin, TX (Nov 1989)

Service to National Science Foundation

- Reviewer of proposals for Information, Robotics, and Intelligent Systems program; and occasionally for other programs
- Panelist for CER Program initial proposal evaluation
- Panelist for SBIR proposal evaluation
- Thrice a site visitor for evaluation of infra structure programs

Invited talks and Seminars

Invited talks on Artificial Intelligence or Computer Vision presented at Universities of Washington, Virginia, West Va., Connecticut, Tennessee, Maryland, Kentucky, New Hampshire, Central Michigan, U. Texas at Arlington, Univ. of Massachusetts, Univ. of South Florida, Wayne State Univ., RPI, VPI, Louisville, Laval, Texas Instruments, Dallas, Calvin College, Michigan Tech., South Florida, Notre Dame, and Howard

Albion College, Michigan (Nov. 2004); Central Michigan Univ. (April 2004, Feb 2006); Swarthmore College, (April 2003); Oakland Univ, Michigan, (Jan. 2003); Tsing-Hua Univ. and Nation Taiwan Normal Univ., Taiwan (Dec 1990); National Univ. of Science and Technology, Islamabad, PK (Jan 1995); Advanced School for Computing and Imaging, Netherlands (May 1995); ECCR, Munich, Germany (May 1995); Fudan Univ and JioTong Univ, Shanghai, China (Dec 1995); Institute for Intelligent Machines, Hefei, China (Dec 1995); TsingHua Univ, and Northern JioTong Univ., Beijing, China (Jan 1996)

ITI, Ann Arbor (Feb 1985), Texas Instruments, Dallas, TX (Jan 1988), Michigan Library Assoc. (Mar 1988), U.S. Army Corps of Engineers, (Apr 1988), MSU College of Education (Dec 1988), North Texas A.I. Assoc. (Jun 1989)

Service to Michigan Institutions and Industry

Taught 2 AI courses at Lear Siegler in Grand Rapids (1983)
 Advice to General Motors Educational Programs (1984)
 Judge for Mid-Michigan Youth Talent Fair (twice)
 Taught 2 AI courses at General Motors in Warren (1984-85)
 Presentation of MSU facilities to MERA Workshop in Novi (Apr 1987)
 Reviewed proposals for Mich. Research Fund (1987)

Advice to U.S. Army Corps of Engineers, Detroit (Apr 1988)
 Consulting to CPS Dept. Central Michigan University (Apr 1989, Feb 2006)
 Consulting to Research Technology Institute of Western, MI (Dec 1989)
 Consulting to law firm regarding patents in machine vision (Aug 1996)
 Partner and developer of ERL,LLC (Summer 2000 Dec. 2004)
 Reviewed academic program proposals from Oakland Univ. and Western Mich.
 Science Day at Woodcreek Elementary, Lansing (April 2004,2005,2006).

PhD Theses Directed

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| A. Goshtasby | PhD(1983) | A Symbolically-Assisted Approach to Digital Image Registration with Application in Computer Vision **co-directed research with Carl Page, Now Full Professor at Wright State Univ. |
| G. Hu | PhD(1988) | 3D Scene Representation using Structured Light, Now Full Professor and Chair at Central Michigan Univ. |
| S.W. Chen | PhD(1989) | 3D Recognition and Pose Detection using Object Wings, Now Full Professor at National Taiwan Normal Univ., Taipei |
| D. Ra | PhD(1989) | On Interleaving Syntax and Semantics in Parsing, Now Associate Professor at Yongsei Univ., Soule |
| J. Miller | PhD(1990) | Computer Aided Process Planning: Task Representation and Sequencing, Now Senior Researcher at Proctor and Gamble, Cincinnati |
| L. Reibling | PhD(1992) | A Neural Network Architecture for Path Planning, Now Associate Professor at Azusa Pacific Univ., CA. |
| G. Lee | PhD(1992) | Scene Representation from fused Range and Intensity Images, Now Associate Professor at National Taiwan Normal Univ., Taipei |
| S. Walsh | PhD(1992) | Indoor Robot Navigation using a Symbolic Landmark Map, Now with U.S. Air Force, Pentagon |
| Q. Huang | PhD(1994) | Hierarchical Token Grouping in Knowledge-based Tubular Object Extraction, Now with ATT Research |
| J.L. Chen | PhD(1996) | On Recognizing and Tracking Curved 3D Objects from 2D Images, Now Senior Researcher with R2 Technology, Inc., CA |
| V. Bakic | PhD(2000) | An Interface for Human-Computer Interaction Based on Face Feature Tracking in 2D, Now Sr. Software Engineer with Bio-Imaging Research, Inc., Chicago |
| P. Albee | PhD(2004) | Analysis and Visualization of Volumetric Data Sets, Now Assistant Professor at Central Michigan University. |
| D. Colbry | PhD(2006) | Human Face Verification by Robust 3D Surface Alignment |
| S. Minut | PhD(2006) | Interpolation Snakes with Shape Priors for Border Detection in Noisy Images. |
| M. Figueroa -Villanueva | PhD(2007) | (Expected) Sensing and Transmission of 3D Head Models |

Courses Taught

- Intro. to Technical Problem Solving, 2006
- Informatics (developed) 2 times, 2002-3

- Technology Base of Information Systems (developed); 1 time, 2001
- Mathematical Programming in C++ (developed); 3 times
- Media Processing and Multimedia (developed); 1 time
- Intro to Computer Graphics; 2 times; used OpenGL, OpenInventor, X-Motif
- Intro to computing I; 6 times; used Fortran, PL/1, Pascal
- Intro to computing II; 8 times; used Pascal
- algs. & data struct (grad immigration); developed and taught 2 times
- Intro to artificial intelligence (grad); 7 times; used Prolog and LISP
- artificial intel. projects (grad); 4 times
- design of intel. sys. (AI+project;undergrad);developed and taught 3 times
- Computer Vision (grad); 7 times
- 3D computer vision topics (grad); 2 times
- Analysis of Algorithms (grad); 1 time
- Algs. & data struct.; 18 times; used C++
- Discrete Structures; 2 times

MSU Committee Service and Special Positions

- Chair of (two) staff hiring committees (2005, 2006)
- CSE Associate Chair (Aug 2005 present)
- Academic Council (MSU) (Aug 2005 - Aug 2006)
- Special Task Force II on Administrator review (Dec. 2005 - Aug. 2006)
- Student ACM Chapter Co-Advisor 2003-2004.
- Local UPE Chapter advisor, Fall 2004 - present
- Advice and Paddle Coaching for MSU Concrete Canoe Team 1988-present.
- CSE Grievance Committee (Chair) 2003-2004.
- Acting Chair of CSE, 1 Jan 2000 - 1 Aug 2001.
- ad hoc tri-college committee on information technology programs
- Tenure and Promotion Committee, since full prof.
- CSE Dept. Curriculum Committee Chair 1998-99; 2003 present
- Eng. College Curriculum Committee Chair 1999.
- Dean of Engineering Search Committee 1998-99.
- CSE Dept. Search Committee 1992-93; 1998-99.
- Director of Lab for Pattern Recognition and Image Processing 1984-85; 1995-96;1997-99.
- Grad Director of CPS Dept. 1990-94
- CPS Department Tenure and Promotion Committee Chair 1995-96 and 96-97
- Engineering Research Council 1986-88 and 1992-96 (Chair 1993-94)
- MSU Graduate Council 1994-1996
- MSU Academic Council 1993-1995
- CPS Dept. Grad Studies Committee, several years
- CPS Curriculum Committee, several years
- Computer Science Advisory Committee 1983-1988
- MSU Com. on Computer Center Operations and Finance 1983-1985
- Computer Science Chair Search Committee 1984-1985
- United Way Coordinator for several units 1984-86