

**Seth Hutchinson**  
**Curriculum Vitae**

**ADDRESS**

The Beckman Institute  
405 North Mathews Avenue  
Urbana, IL 61801

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**CURRENT POSITION**

Professor of Electrical and Computer Engineering  
Research Professor, Beckman Institute  
Research Professor, Coordinated Science Laboratory  
—*University of Illinois at Urbana-Champaign*, 2003-present

**EDUCATION**

Ph.D. Electrical Engineering, Purdue University, Dec. 1988  
Master of Science, Electrical Engineering, Purdue University, Dec. 1984  
Bachelor of Science, Electrical Engineering, Purdue University, May 1983

**EARLIER POSITIONS AND SABBATICAL LEAVES**

- **2001-2007:** University of Illinois at Urbana-Champaign
  - Associate Head for Undergraduate Affairs, Electrical and Computer Engineering
- **2005:** The Australian National University
  - Visiting Fellow
- **1996-2003:** University of Illinois at Urbana-Champaign
  - Associate Professor of Electrical and Computer Engineering
  - Research Assc. Professor, Beckman Institute
  - Research Assc. Professor, Coordinated Science Laboratory
- **1997-1998:** Ecole Nationale Supérieure des Télécommunications, Paris, France
  - Visiting Professor
- **1990-1996:** University of Illinois at Urbana-Champaign
  - Assistant Professor of Electrical and Computer Engineering
  - Research Asst. Professor, Beckman Institute
  - Research Asst. Professor, Coordinated Science Laboratory
- **1989:** Purdue University
  - Visiting Assistant Professor of Electrical Engineering
- **1983-1988:** Purdue University
  - Teaching and Research Assistant

**RESEARCH INTERESTS**

Vision-based control of robotic manipulators, robot motion planning, computer vision

## TEACHING

- **Courses Developed:**
  - ◊ ECE 550 Advanced Robotic Planning
  - ◊ ECE 470 Introduction to Robotics (with Professors Spong and Ahuja)
  - ◊ ECE 379 Robot Sensing (with Professor Ahuja)
- **Course Instructor:**
  - ◊ Introduction to Computing Systems (ECE 190)
  - ◊ Analog Signal Processing (ECE 210)
  - ◊ Computer Engineering I (ECE 290)
  - ◊ Introduction to Robotics (ECE 470)
  - ◊ Robot Sensing (379)
  - ◊ Advanced Robotic Planning (ECE 550)
  - ◊ Introduction to Optimization (ECE 490)
  - ◊ Probability with Engineering Applications (ECE 413)
  - ◊ Logic Design (ECE 462)
  - ◊ Engineering Ethics (ECE 316)
- **Short Courses:**
  - ◊ *Robot Motion Planning*, a four week graduate course given at the Tecnológico de Monterrey, Campus Estado de México, June 2005
  - ◊ *Robotics and Computer Vision*, a three day short course offered through the Office of Continuing Engineering Education at the University of Illinois, Summer 1993 (with Professor Ponce)

## PROFESSIONAL ACTIVITIES

- **Editorships**
  - ◊ Editor-in-Chief, Conference Editorial Board, IEEE Robotics and Automation Society 2006-present
  - ◊ Editorial Board, *International Journal of Robotics Research*, 2005-present
  - ◊ Editorial Board, *Journal of Intelligent Service Robotics*, 2005-present
  - ◊ Editor, *IEEE Transactions on Robotics and Automation*, 2000-2005
  - ◊ Guest Editor, *International Journal of Computer Vision and International Journal of Robotics Research: Joint Special Issue on Vision and Robotics*, Nov., 2007
  - ◊ Guest Editor, *International Journal of Robotics Research*, Jul.-Aug. 2004
  - ◊ Associate Editor, *IEEE Transactions on Robotics and Automation* 1997-2000
  - ◊ Guest Editor, *IEEE Transactions on Robotics and Automation*, Special section on visual servo control, October 1996
- **IEEE Robotics and Automation Society, Offices and Committees**
  - ◊ Associate Vice President for Publications, 2005-2006
  - ◊ Member of the AdCom, 2006-2009
  - ◊ Member of the conference board and the member services committee, 2005-present
  - ◊ Co-chair, Technical Committee on Computer and Robot Vision (1992-1996)
  - ◊ Member of the ad hoc committee to rename and redefine the scope of the *IEEE Transactions on Robotics and Automation*, 2002
- **Conference and Workshop Chair**
  - ◊ Region Co-chair for the Americas, *IEEE Int'l Conf. on Intelligent Robots and Systems (IROS)*, 2008
  - ◊ Program Co-chair for America, *13th International Conference on Advanced Robotics*, 2007
  - ◊ Co-chair, *Workshop on the Algorithmic Foundations of Robotics*, 2002
  - ◊ Program Vice-chair, *9TH IEEE International Conference on Tools with Artificial Intelligence*

(ICTAI97), November 1997

- ◇ Co-chair, IEEE Workshop on Visual Servoing: Achievements, Applications and Open Problems, San Diego, May 1994

- **Tutorials**

- ◇ “Visual Servo Control” (given at the IEEE Int’l Conf. on Robotics and Automation, 1996)
- ◇ “Multisensor Fusion Under Uncertainty: Bayes Methods and the Dempster-Shafer Theory” (given at the IEEE Int’l Conf. on Multisensor Fusion and Integration for Intelligent Systems, 1994)

- **Program Committees**

- ◇ IEEE Int’l Conf. on Intelligent Robots and Systems (IROS): 1992, 1994, 1996, 1998, 2001-2006, 2008
- ◇ IEEE Int’l Conf. on Robotics and Automation (ICRA): 1994, 1996, 1997 1999-2003, 2005-2006
- ◇ Workshop on the Algorithmic Foundations of Robotics (WAFR): 1994, 2002, 2006, 2008
- ◇ International Conference on Informatics in Control, Automation and Robotics (ICINCO): 2007
- ◇ International Conference on Control, Automation and Systems (ICCAS): 2007
- ◇ IASTED International Conference on Robotics and Applications: 2007
- ◇ 13th International Conference on Advanced Robotics: 2007
- ◇ SICE-ICASE International Joint Conference: 2006
- ◇ SPIE Conf. on Optomechatronic Systems Control: 2006
- ◇ Robotics: Science and Systems (RSS): 2005
- ◇ Int’l Conf. on Computer Vision Theory and Applications (VISAPP): 2006
- ◇ IEEE Int’l Conf. on Multisensor Fusion and Integration for Intelligent Systems (MFI): 1994, 1996, 1999, 2001, 2003, 2006, 2008
- ◇ Int’l Conf. on Pattern Recognition (ICPR): 2002
- ◇ IEEE Int’l Conf. on Comp. Vision and Pattern Recognition (CVPR): 1996, 1997, 2000, 2001
- ◇ IEEE Int’l Conf. on Industrial Electronics, Technology & Automation (IETA): 2001
- ◇ Thirty-First International Symposium on Robotics (ISR): 2000
- ◇ SPIE Conf. on Sensor Fusion and Decentralized Control in Autonomous Robotic Sys.: 1997, 1999
- ◇ IEEE Workshop on Perceptual Organization in Computer Vision (held with CVPR): 1998
- ◇ Nat’l Conf. on Artificial Intelligence (AAAI): 1994, 1996
- ◇ Sixth Int’l Symposium on Robotics and Manufacturing (ISRAM): 1996
- ◇ IROS Workshop on Vision for Robots: 1995
- ◇ SPIE Conf. on Neural and Stochastic Methods in Image and Signal Processing: 1992, 1993, 1994
- ◇ The Twelfth Int’l Conf. on Pattern Recognition — Comp. Vision and Applications: 1994
- ◇ SPIE Conf. on Applications of Artificial Intelligence XI: Machine Vision and Robotics: 1993
- ◇ SPIE Conf. on Stochastic Methods in Signal Proc., Image Proc., and Comp. Vision: 1991

- **Reviewer**

- ◇ **National Science Foundation** Spring 1994, Fall 1995, Spring 1997, Spring 2002, Winter 2008
- ◇ **NASA**: Spring 1999, Winter 2005, Winter 2006, Fall 2007
- ◇ **INRIA**: evaluation of the *control and complex systems* program, Fall 2004
- ◇ **Ben Dasher Award Selection Committee**, Frontiers in Education Conference, 1993
- ◇ **Journals**: IEEE Trans. on Robotics and Automation, Robotics and Autonomous Systems, International Journal of Robotics Research, IEEE Trans. on Image Processing, IEEE Trans. on Pattern Analysis and Machine Intelligence, IEEE Trans. on Computers, IEEE Trans. on Systems, Man, and Cybernetics, IEEE Computer Magazine, IEEE Control Magazine, Journal of Robotic Systems, ASME Trans. Journal of Engineering for Industry, Computer Vision, Graphics, and Image Processing: Image Understanding, Robotics and Computer-Integrated Manufacturing
- ◇ **Conferences and Workshops**: dozens of technical conferences and workshops

- **Professional Memberships**: IEEE (Fellow)

## INVITED LECTURES, SEMINARS, AND COLLOQUIA

- GRASP Lab, University of Pennsylvania (May 2007)
- Colloquium on Robotics and Automation, Università Degli Studi di Napoli Federico II, Naples Italy (Dec. 2006)
- LAAS, Toulouse, France (June 2006)
- Dagstuhl Seminar on Form and Content in Sensor Networks, Wadern, Germany (Sep. 2005)
- Tecnológico de Monterrey, Campus Estado de México (June 2005)
- University of Florida (April, 2005)
- The Australian National University (January, 2005)
- Johns Hopkins University (April, 2003)
- Carnegie Mellon University (April, 2002)
- University of Louisville (May, 2001)
- Dagstuhl Seminar on Modelling of Sensor-Based Intel. Robot Sys., Wadern, Germany (Oct. 2000)
- Simon Fraser University, Vancouver, Canada (Sept. 2000)
- Joint EU-US Workshop on Key Research Issues and Opportunities in Motion Planning (July 2000)
- Technical University of Vienna, Austria (November 1999)
- Technical University of Munich, Germany (November 1999)
- Iowa State University (November 1998)
- IRISA/INRIA, Rennes, France (June 1998)
- Technical University of Munich, Germany (June 1998)
- LAAS, Toulouse, France (May 1998)
- Blaise Pascal University, France (June 1996)
- University of Texas at Austin (June 1995)
- Oak Ridge National Laboratory (Jan. 1995)
- Texas A & M University (May 1994)
- Michigan State University — Pattern Recognition and Image Processing Laboratory (Nov. 1993)
- Michigan State University — Dept. of Computer Science (Nov. 1993)
- Carnegie Mellon University — Robotics Institute (Oct. 1993)
- Carnegie Mellon University — Vision and Autonomous Systems Center (Oct. 1993)
- Rensselaer Polytechnic Institute (March 1993)
- Illinois State University (March 1992)
- University of Chicago (Jan. 1992)
- University of Notre Dame (Jan. 1992)
- University of South Florida (April 1991)
- Illinois Institute of Technology (April 1991)

## AWARDS AND HONORARIES

- Best paper award, *Fourth Mexican Int'l Conf. on Artificial Intelligence*, R. Murrieta-Cid, A. Sarmiento, T. Muppírala, S. Hutchinson, R. Monroy, M. Alencastre-Miranda, L. Muñoz-Gmez and R. Swain, "A Framework for Reactive Motion and Sensing Planning: A Critical Events-based Approach," in *Advances in Artificial Intelligence — MICAI*, A. Gelbukh, A. Albornoz, H. Terashima-Marn Eds., Springer-Verlag LCNS 3789, 2005, pp. 990-1000.
- José Negrete best paper award, *IX Ibero-American Conference on Artificial Intelligence (IBERAMIA)*, A. Sarmiento, R. Murrieta-Cid and S. Hutchinson, "A Multi-robot Strategy for Rapidly Searching a Polygonal Environment," in *Advances in Artificial Intelligence — IBERAMIA*, C. Lemaître, C. A. Reyes, J. A. González Eds., Springer-Verlag, Heidelberg, LCNS 3315, 2004, pp. 484-493.
- Finalist (one of five) for the 1998 King-Sun Fu Memorial Best Transactions Paper Award, S. LaValle and S. Hutchinson, "Multiple-Robot Motion Planning Under Independent Objectives," *IEEE Trans.*

*on Robotics and Automation*, Vol. 14, No. 6, Dec. 1998, pp. 912-925.

- Finalist (one of five) for the 1996 King-Sun Fu Memorial Best Transactions Paper Award, S. Hutchinson, G. Hager, and P. Corke, "A Tutorial on Visual Servo Control," *IEEE Trans. on Robotics and Automation*, Vol. 12, No. 5, Oct. 1996, pp. 651-670.
- Distinguished Student Paper Award (Steve LaValle), Ninth Conference on Uncertainty in Artificial Intelligence, 1993, S. LaValle and S. Hutchinson, "On Considering Uncertainty and Alternatives in Low-Level Vision."
- Arnold O. Beckman Research Award, 1994
- NSF Research Initiation Award, 1991
- Magoon Teaching Award, 1985
- Eta Kappa Nu

## THESIS SUPERVISION

### Ph.D. Thesis Supervision

- 1 Nicholas Gans, *Hybrid Switched System Visual Servo Control*, Ph.D., Dec. 2005.
- 2 Alejandro Sarmiento, *Generating Expected-Time Efficient Trajectories for Rapidly Finding an Object in Known Environments*, Ph.D., Dec. 2004.
- 3 Peter Leven, *A Framework for Real-Time Path Planning in Changing Environments*, Ph.D., May 2001.
- 4 Kevin Nickels, *Model Based Tracking of Articulated Objects*, Ph.D., Aug. 1998.
- 5 Rebecca Castano, *Yield Estimation for Multichip Module Ceramic Substrates*, Ph.D., Dec. 1997.
- 6 Michael Barbehenn, *Toward Incremental Geometric Robot Motion Planning*, Ph.D., Dec. 1995.
- 7 Steven LaValle, *A Game-Theoretic Framework for Robot Motion Planning*, Ph.D., Aug. 1995.

### M.S. Thesis Supervision

- 8 Sourabh Bhattacharya, *Optimal Paths for Landmark-Based Navigation by Nonholonomic Vehicles with Field-of-View Constraints*, M.S.E.E., May 2005.
- 9 Stephen Kloder, *Permutation-Invariant Multi-Robot Formations: A Complex Polynomial-Based Foundation*, M.S.C.S., Dec. 2004.
- 10 Jerome Durand, *Real-Time Object Tracking Using Multiresolution Critical Points Filters*, M.S.E.E., Dec. 2002.
- 11 Nicholas Gans, *Performance Tests of Partitioned Approaches to Visual Servo Control*, M.S.E.E., May 2002.
- 12 Peter Kim, *Interactive Image Segmentation Using Level Set Methods in a Virtual Reality Environment*, M.S.C.S., Aug. 2000.
- 13 Youngmin Kim, *Projective Geometry and Visual Servoing*, M.S.E.E., Dec. 1997.
- 14 Eric Gree, *Using Corresponding Points for Object Modeling*, M.S.E.E., Dec. 1996.
- 15 Peter Leven, *A Multithreaded Implementation of a Robot Control C Library*, M.S.E.E., Dec. 1996.
- 16 Salvatore M. Mazzola, *Design and Control of an Underactuated Robot*, M.S.E.E., Dec. 1995.
- 17 Kevin Nickels, *Textured Image Segmentation Using Markov Random Fields: Returning Multiple Solutions*, M.S.E.E., Dec. 1995.
- 18 Ken Moroney, *Implementation and Analysis of Lowe's Model-Based Motion Tracking System*, M.S.E.E., May 1995.
- 19 Fredrick Geiger, *Hybrid Force/Vision Control of Robotic Manipulators*, M.S.E.E., December 1994.

- 20 Rebecca Castaño, *A Probabilistic Framework for Grouping Image Features*, M.S.E.E., August 1994.
- 21 James Reed, *Subpixel Parameter Estimation for Circular Shapes Using Image Sequences*, M.S.E.E., May 1994.
- 22 Michael Barbehenn, *Efficient Search and Hierarchical Motion Planning by Dynamically Maintaining Single-Source Shortest Paths Trees*, M.S.C.S., February, 1993.
- 23 Steven M. LaValle, *A Bayesian Framework for Considering Probability Distributions of Image Segments and Segmentations*, M.S.E.E., December, 1992.
- 24 Sandeep Pandya, *A Case-Based Approach to Robot Motion Planning*, M.S.C.S., August 1992.
- 25 Andrés Castaño, *Hybrid Vision/Position Servo Control of a Robotic Manipulator*, M.S.E.E., August, 1992.
- 26 Armando Fox, *Exploiting Visual Geometric Constraints in Robot Motion Planning with Uncertainty*, M.S.E.E., May 1992.
- 27 Robert Spence, *Avoiding Unexpected Moving Obstacles by Integrating Potential Field Planning and Real-Time Control*, M.S.E.E., May 1992.

#### External Examination Committees

- ◊ Guoqiang Hu, *Ph.D.*, University of Florida (Nov., 2007)
- ◊ David Folio, *Ph.D.*, l'Institut National Polytechnique de Toulouse, France (Jul., 2007)
- ◊ Eric Royer, *Ph.D.*, l'Université Blaise Pascal de Clermont-Ferrand (Sep., 2006)
- ◊ Eric Marchand, *Habilitation à diriger des recherches*, Université de Rennes, France (Nov. 2004)
- ◊ Omar Tahri, *Ph.D.*, Université de Rennes, France (Mar., 2004)
- ◊ Yong Yu, *Ph.D.*, Simon Fraser University, Vancouver, Canada (Sept. 2000)
- ◊ Zachary Dodds, *Ph.D.*, Yale University, New Haven, Connecticut (Jan., 2000)
- ◊ Stéphanie Jonquière, *Ph.D.*, l'Institut National Polytechnique de Toulouse, France (Jan., 2000)
- ◊ Alexa Hauck, *Ph.D.*, Technical University of Munich, Germany (Nov., 1999)
- ◊ Hilmi Rifai, *Ph.D.*, Ecole Nationale Supérieure des Télécommunications, Paris, France (Nov., 1999)
- ◊ Ricardo Swain Oropeza, *Ph.D.*, l'Institut National Polytechnique de Toulouse, France (Jun., 1999)

#### PUBLICATIONS

##### Books

- 1 M. Spong, S. Hutchinson, M. Vidyasagar, *Robot Modeling and Control*, John Wiley and Sons, New York, 2006.
- 2 H. Choset, K. M. Lynch, S. Hutchinson, G. Kantor, W. Burgard, L. E. Kavraki and S. Thrun, *Principles of Robot Motion: Theory, Algorithms, and Implementations*, MIT Press, Boston, 2005.
- 3 J.-D. Boissonnat, J. Burdick, K. Goldberg and S. Hutchinson, eds., *Algorithmic Foundations of Robotics V*, Springer-Verlag, Heidelberg, Germany, 2003.

##### Articles

- 4 N. Gans and S. Hutchinson, "Multi-Attribute Utility Analysis in the Choice of a Vision-Based Robot Controller," *The International Journal of Optomechatronics*, to appear.
- 5 F. Chaumette and S. Hutchinson, "Visual Servo Control, Part II: Advanced Approaches," *IEEE Robotics and Automation Magazine*, Volume 14, Issue 1, March 2007 pp. 109 - 118.
- 6 N. Gans and S. Hutchinson, "Stable Visual Servoing through Hybrid Switched-System Control," *IEEE Trans. on Robotics*, Vol. 23, No. 3, June, 2007, pp. 530-540.

- 7 R. Murrieta-Cid, T. Muppirala, A. Sarmiento, S. Bhattacharya, and S. Hutchinson, "Surveillance Strategies for a Pursuer with Finite Sensor Range," *Int'l Journal of Robotics Research*, Vol. 26, No. 3, 2007, pp. 233-253.
- 8 S. Bhattacharya, R. Murrieta-Cid, and S. Hutchinson, "Optimal Paths for Landmark-based Navigation by Differential Drive Vehicles with Field-of-View Constraints," *IEEE Trans. on Robotics*, Vol. 23, No. 1, Feb., 2007, pp. 47-59.
- 9 B. Tovar, L. Munoz-Gomez, R. Murrieta-Cid, M. Alencastre-Miranda, R. Monroy and S. Hutchinson, "Planning Exploration Strategies for Simultaneous Localization and Mapping," *Journal of Robotics and Autonomous Systems*, Vol. 54, No. 4, Apr., 2006, pp. 314-331.
- 10 F. Chaumette and S. Hutchinson, "Visual Servo Control, Part I: Basic Approaches," *IEEE Robotics and Automation Magazine*, Vol. 13, No. 4, Dec., 2006, pp. 82-90.
- 11 S. Kloder and S. Hutchinson, "Path Planning for Permutation-Invariant MultiRobot Formations," *IEEE Trans. on Robotics*, Vol. 22, No. 4, 2006, pp. 650-665.
- 12 R. Murrieta, B. Tovar and S. Hutchinson, "A Sampling-Based Motion Planning Approach to Maintain Visibility of Unpredictable Targets," *Autonomous Robots*, Vol. 19, No. 3, 2005, pp. 285-300.
- 13 N. Gans, S. Hutchinson and P. Corke, "Performance Tests for Visual Servo Control Systems, with Application to Partitioned Approaches to Visual Servo Control," *Int'l Journal of Robotics Research*, Vol. 22, No. 10-11, Oct.-Nov. 2003, pp. 955-981.
- 14 P. Leven and S. Hutchinson, "Using Manipulability to Bias Sampling During the Construction of Probabilistic Roadmaps," *IEEE Trans. on Robotics and Automation*, Vol. 19, No. 6, Dec. 2003, pp. 1020-1026.
- 15 P. Leven and S. Hutchinson, "Realtime Path Planning in Changing Environments," *Int'l Journal of Robotics Research*, vol. 21, No. 12, Dec. 2002, pp. 999-1030.
- 16 P. Ranganathan, J.B. Hayet, M. Devy, S. Hutchinson and F. Lerasle, "Topological Navigation and Qualitative Localization for Indoor Environment Using Multisensory Perception," *Robotics and Autonomous Systems*, Vol. 41, Nos. 2-3, Nov. 2002, pp. 137-144.
- 17 K. Nickels and S. Hutchinson, "Estimating Uncertainty in SSD-Based Feature Tracking," *Image and Vision Computing*, vol. 20, no. ER1, 2002 pp. 47-58
- 18 P. I. Corke and S. A. Hutchinson, "A New Partitioned Approach to Image-Based Visual Servo Control," *IEEE Trans. on Robotics and Automation*, Vol. 17, No. 4, Aug. 2001, pp. 507-515.
- 19 K. Nickels and S. Hutchinson, "Model-Based Tracking of Complex Articulated Objects," *IEEE Trans. on Robotics and Automation*, Vol. 17, No. 1, Feb. 2001, pp. 28-36.
- 20 H. Rifai, I. Bloch, S. Hutchinson, J. Wiart and L. Garnero, "Segmentation of the Skull Using Deformable Model and Taking Partial Volume Effect into Account," *Medical Image Analysis*, Vol. 4, Iss. 3, Sept. 2000, pp. 219-233.
- 21 H. Rifai, I. Bloch, S. Hutchinson, J. Wiart and L. Garnero, "Segmentation par modèle déformable des régions osseuses de la tête dans les volume IRM," *Traitement du Signal*, Vol. 16, No. 4, 1999, pp. 319-330.
- 22 S. LaValle and S. A. Hutchinson, "Optimal Motion Planning for Multiple Robots Having Independent Goals," *IEEE Trans. on Robotics and Automation*, Vol. 14, No. 6, Dec. 1998, pp. 912-925.

- 23 S. LaValle and S. A. Hutchinson, "An Objective-Based Framework for Motion Planning Under Sensing and Control Uncertainties," *Int'l Journal of Robotics Research*, Vol. 17, No. 1, Jan. 1998, pp. 19-42.
- 24 S. LaValle, K. Moroney and S. A. Hutchinson, "Methods for Numerical Integration of High-Dimensional Posterior Densities with Application to Statistical Image Models," *IEEE Trans. on Image Processing*, Vol. 6, No. 12, Dec. 1997, pp. 1659-1672.
- 25 K. Nickels and S. Hutchinson, "Textured Image Segmentation: Returning Multiple Solutions," *Image and Vision Computing*, Vol. 15, 1997, pp. 781-795.
- 26 R. Sharma and S. Hutchinson, "Motion Perceptibility and Its Application to Active Vision-Based Servo Control," *IEEE Trans. on Robotics and Automation*, Vol. 13, No. 4, 1997, pp. 607-617.
- 27 R. L. Castaño and S. A. Hutchinson, "A Probabilistic Approach to Perceptual Grouping," *Computer Vision and Image Understanding*, Vol.64, No. 3, Nov. 1996, pp. 399-419.
- 28 B. Bishop, S. A. Hutchinson and M. W. Spong, "Camera Modelling for Visual Servo Control Applications," *Mathematical and Computer Modelling*, Special issue on Modelling Issues in Visual Sensing, Vol. 24, No. 5/6, 1996, pp. 79-102.
- 29 S. Hutchinson, G. Hager and P. Corke, "A Tutorial on Visual Servo Control," *IEEE Trans. on Robotics and Automation*, Vol. 12, No. 5, Oct. 1996, pp. 651-670.
- 30 J. Reed and S. Hutchinson, "Image Fusion and Subpixel Parameter Estimation for Automated Optical Inspection of Electronic Components," *IEEE Trans. on Industrial Electronics*, Vol. 43, No. 3, June 1996, pp. 346-354.
- 31 R. Sharma, S. LaValle and S. A. Hutchinson, "Optimizing Robot Motion Strategies for Assembly with Stochastic Models of the Assembly Process," *IEEE Trans. on Robotics and Automation*, Vol. 12, No. 2, Apr. 1996, pp. 160-174.
- 32 M. Barbehenn and S. Hutchinson, "Efficient Search and Hierarchical Motion Planning By Dynamically Maintaining Single-Source Shortest Paths Trees," *IEEE Trans. on Robotics and Automation*, Vol. 11, No. 2, Apr. 1995, pp. 198-214.
- 33 S. LaValle and S. A. Hutchinson, "A Bayesian Framework for Constructing Probability Distributions on the Space of Image Segmentations," *Computer Vision and Image Understanding*, Vol. 61, No. 2, March 1995, pp. 203-230.
- 34 A. Fox and S. A. Hutchinson, "Exploiting Visual Constraints in the Synthesis of Uncertainty-Tolerant Motion Plans," *IEEE Trans. on Robotics and Automation*, Vol. 11, No. 1, Feb. 1995, pp. 56-71.
- 35 S. LaValle and S. A. Hutchinson, "Image Segmentation Using a Bayesian Region Merging Probability," *IEEE Trans. on Pattern Analysis and Machine Intelligence*, Vol. 17, No. 2, Feb. 1995, pp. 211-217.
- 36 R. Spence and S. Hutchinson, "An Integrated Architecture for Robot Motion Planning and Control in the Presence of Obstacles with Unknown Trajectories," *IEEE Trans. on Systems, Man, and Cybernetics*, Vol. 25, No. 1, Jan. 1995, pp. 100-110.
- 37 A. Castano and S. A. Hutchinson, "Visual Compliance: Task-Directed Visual Servo Control," *IEEE Trans. on Robotics and Automation*, Vol. 10, No. 3, June 1994, pp. 334-342.
- 38 N. Mahadevamurty, T-C. Tsao and S. Hutchinson, "Multi-Rate Analysis and Design of Visual Feedback Digital Servo Control Systems," *ASME Journal of Dynamic Systems, Measurement and Control*,

Vol. 116, No. 1, March 1994, pp. 45-55.

- 39 S. A. Hutchinson and A. C. Kak, "SPAR: A Planner that Satisfies Operational and Geometric Goals in Uncertain Environments," *AI Magazine*, Vol. 2, No. 1, Spring 1990, pp. 30-61.
- 40 S. A. Hutchinson and A. C. Kak, "Planning Sensing Strategies in a Robot Work Cell with Multi-Sensor Capabilities," *IEEE Trans. on Robotics and Automation*, Vol. 5, No. 6, Dec. 1989, pp. 765-783.

### Book Chapters

- 41 F. Chaumette and S. Hutchinson, "Visual Servoing and Visual Tracking," in *Springer Handbook of Robotics* B. Siciliano and O. Khatib Eds., 2008.
- 42 R. Murrieta-Cid, A. Sarmiento, T. Muppirala, S. Hutchinson, R. Monroy, M. Alencastre-Miranda, L. Muoz-Gmez and R. Swain, "A Framework for Reactive Motion and Sensing Planning: A Critical Events-Based Approach," in *Advances in Artificial Intelligence — MICAI*, A. Gelbukh, A. Albornoz, H. Terashima-Marn Eds., Springer-Verlag LNCS 3789, 2005, pp. 990-1000.
- 43 S. Hutchinson and P. Leven, "Planning Collision-Free Paths Using Probabilistic Roadmaps," in *Handbook of Geometric Computing: Applications in Pattern Recognition, Computer Vision, Neural-computing, and Robotics*, Eduardo Bayro Corrochano, Ed., Springer Verlag, Heidelberg, 2005, pp. 717-748.
- 44 A. Sarmiento, R. Murrieta-Cid and S. Hutchinson, "A Multi-robot Strategy for Rapidly Searching a Polygonal Environment," in *Advances in Artificial Intelligence – IBERAMIA*, C. Lemaître, C. A. Reyes, J. A. González Eds., Springer-Verlag, Heidelberg, LNCS 3315, 2004, pp. 484-493.
- 45 P. I. Corke, S. A. Hutchinson and N. R. Gans, "Partitioned Image-Based Visual Servo Control: Some New Results," in *Sensor Based Intelligent Robots*, G. D. Hager, H. I. Christensen, H. Bunke, R. Klein Eds., Springer LNCS 2238, 2002, pp. 122-140.
- 46 P. Leven and S. Hutchinson, "Toward Real-Time Motion Planning in Dynamic Environments," in *Algorithmic and Computational Robotics: New Directions*, B. R. Donald, K. M. Lynch and D. Rus Eds., A. K. Peters, Natick, MA, 2001, pp. 363-376.
- 47 J. Reed and S. A. Hutchinson, "Data Fusion for Inspection of Electronic Components," in *Applications of NDT Data Fusion*, X. Gros Ed., Kluwer Academic Publishers, Norwell, MA, 2001, pp. 105-128.
- 48 K. Nickels and S. A. Hutchinson, "Integrated Object Models for Robust Visual Tracking," in *Robust Vision for Vision-Based Control of Motion*, M. Vincze and G.D. Hager Eds., IEEE Press, 2000, pp. 30-51.
- 49 S. M. LaValle and S. A. Hutchinson, "Considering Multiple-Surface Hypotheses in a Bayesian Hierarchy," in *Selected SPIE Papers on CD-ROM, Vol 8: Mathematical Imaging and Vision*, Gerhard Ritter Ed., SPIE Press, 1999.
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