

# Carlo Tomasi

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## Education and Work Experience

- Duke University, Full Professor, 2004–present.
- Duke University, Associate Professor, 2001–2004.
- Canesta, Inc., Software Architect, 2001–2004.
- Stanford University, Assistant Professor, 1994–2001.
- Cornell University, Assistant Professor, 1991–1993.
- Carnegie Mellon University, PhD, 1985–1991. Thesis on *Shape and Motion from Image Streams: a Factorization Method*. Advisor Prof. T. Kanade.
- University of Padua, Italy, Doctorate 1984–1987. Thesis on *Communication Issues in Distributed Computing Systems* (in italian). Advisor Prof. G. Cariolaro.
- University of Massachusetts at Amherst, MS in Electrical and Computer Engineering, 1982–1984. Thesis on *Modular and Multiplier-Free Digital Filters*. Advisor Prof. L. E. Franks.
- University of Padua, Italy, "Laurea" degree with honors in Electrical Engineering, 1976–1981. Thesis on *Pseudorandom Sequences for Spread Spectrum Communications Systems* (in italian). Advisor Prof. S. Pupolin.

## Students Graduated

- Tingting Jiang, PhD, 2007. Thesis on *Tracking Dynamic Boundaries with Evolving Curves*.
- Daniel Russakoff, PhD, 2003. Thesis on *2D-3D Registration Methods for Medical Imaging*.
- Michael Lin, PhD, 2002. Thesis on *Surfaces with Occlusions from Layered Stereo*.
- Salih Burak Gokturk, PhD, 2001. Thesis on *Shape Recognition with Applications to Medical Imaging*.
- Mark Ruzon, PhD, 1999. Thesis on *Early Vision Using Distributions*.
- John Zhang, PhD, 1999. Thesis on *The Computation of Camera Heading*.
- Stan Birchfield, PhD, 1999. Thesis on *Depth and Motion Discontinuities*.
- Tong Zhang, PhD 1998 (co-advised with Gene Golub). Thesis on *Methods for Computational and Statistical Estimation with Applications*.
- Yossi Rubner, PhD 1998. Thesis on *Perceptual Metrics for Image Database Navigation*.

## Teaching

- Computational Modeling for the Sciences, Duke, Spring 2007, 2008.

- Introduction to Computer Vision, Duke, each Spring 2003–2006, Fall 2007, 2008; Stanford, each Winter 1995–2000 and Cornell, Fall 1992.
- Discrete Mathematics, Duke, Fall 2005 and 2006.
- Mathematical Modelling of Continuous Systems, Duke, each Fall 2002–2004 and Stanford, each Fall 1994–2000.
- Topics in Computer Vision, Stanford, each Spring 1994–2000.
- Broad-Area Colloquium for AI, Geometry, Graphics, Robotics, and Vision (coordination of weekly seminars throughout the year), 1999–2000.
- Principles of Experimentation for Robotics and Vision, Stanford, Spring 1994.
- Foundations of Artificial Intelligence, Cornell, Fall 1991.
- Practicum of Artificial Intelligence, Cornell, Fall 1991.
- Introduction to Computer Science, Cornell, Spring 1992–1993.
- Lecture series on Stochastic Estimation Theory, Carnegie-Mellon University, Fall 1990.

## Referee and Conference Organization Work

- General program co-chair for the 2005 IEEE Conference on Computer Vision and Pattern Recognition (CVPR).
- Area chair for the IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 1999, 2003, 2004, and 2007.
- Co-organizer, CVPR Workshop on 3D Sensors and their Use, 2004 and 2005.
- Program committee member for
  - International Conference on Computer Vision (ICCV), 1995, 1998, 2003, and 2009.
  - European Conference on Computer Vision, ECCV, 2006, 2008.
  - Dynamic 3D Imaging Workshop, 2009.
  - International Conference on Computer Vision Theory and Applications, VISAPP, Funchal, Portugal, 2008.
  - 3rd International Symposium on 3D Data Processing, Visualization, and Transmission, UNC Chapel Hill, 2006.
  - Vision, Modeling, and Visualization Conference, Erlangen, Germany, 2005.
  - IEEE CVPR Motion Workshop, San Diego, CA, 2005.
  - 2nd IEEE CVPR Workshop on Human-Computer Interaction, San Diego, CA, 2005.
  - 2nd International Symposium on 3D Data Processing, Visualization and Transmission, Thessaloniki, Greece, 2004.
  - IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 1993 and 1997.
- Co-organizer, National Science Foundation Workshop for Robotics and Computer Vision, 2003.
- Reviewer, National Science Foundation grant review panels, 1994, 1998, 1999, 2003, 2004, 2007.
- Associate editor for the SIAM Journal of Matrix Analysis and Applications (SIMAX), 1996-1998.

- Referee for several Computer Vision and Graphics conferences (CVPR, ICCV, IJCAI, SIGGRAPH), and for the following Journals: Nature; International Journal of Computer Vision; Journal of Mathematical Imaging and Vision; IEEE Transactions on Pattern Analysis and Machine Intelligence; Computer Vision, Graphics, and Image Processing; Computer Vision and Image Understanding; IEEE Transactions on Robotics and Automation; Pattern Recognition Letters; IEEE Transactions on Circuits and Systems.

## Research Grants

- Principal Investigator: *Manos Teatrales (Theatrical Hands): Cyber-Paleography and a Virtual World of Spanish Golden Age Theater*. National Endowment for the Humanities, 2009–2010. Supported in part by an American Council of Library Sciences Digital Innovation Fellowship, 2010. With M. R. Greer (Duke).
- Co-Investigator: *Manos Teatrales*. Duke Provost Common Fund, 2008–2009. With M. R. Greer (Duke).
- Co-Investigator: *Doctoral Program in Management and Analysis of Large Data Sets Acquired from Sensors*. Department of Education, 2007–2010. With Richard Lucic (PI), Susan Rodger, Jeff Chase, Ronald Parr, Jeff Forbes, Shivnath Babu, Carla Ellis, Jun Yiang, David Bell, John Harer, Martha Absher (Duke).
- Principal Investigator: *Visual Learning in Context*. NSF, 2005–2008.
- Principal Investigator: *Stereo Matching for DARPA's Grand Challenge*. SAIC, 2005–2008.
- Principal Investigator: *CRI: A Core Experimental Facility for Computer Vision and Artificial Intelligence*. NSF CISE Research Infrastructure Grant, with Ronald Parr, CS, Duke, 2005–2007.
- Principal Investigator: *Computing a Semantic View of a Scene for Surveillance from Stereo and Discreet LIDAR*, Phase I Army SBIR, subcontract from Intelligent Automation, Inc., 2005–2006. With Ronald Parr (Duke).
- Principal Investigator: *Using Evolving Curves to Track Dynamic Boundaries*. Phase II Army STTR Grant (Army03-T08) with Vikram Manikonda, Intelligent Automation, Inc., 2004–2006.
- Principal Investigator: *Tracking Level Sets*. NSF, 2004.
- Principal Investigator: *Stereo Matching*. SAIC, 2002–2004.
- Principal Investigator: *Randomized Invariant Features for Recognition*. NSF, 2002–2005. Collaboration with Roberto Manduchi, UCSC.
- Co-Investigator: *Using Evolving Curves to Track Dynamic Boundaries*. Phase I Army STTR grant. Subcontracted, with Vikram Manikonda, Intelligent Automation, Inc., 2003.
- Principal investigator: *Imaging and Learning Techniques for the Detection of Anomalous Structures in 3D Medical Images*. Stanford Bio-X Inter Disciplinary Initiatives Program, 2000–2002.
- Co-investigator: *CT Colonography*. NIH. 1999–2001.
- Principal investigator: *Motion Discontinuities from an Image Sequence*. ST Microelectronics, 2000–2001.
- Principal Investigator: *Vision for P4*. Honda, 2000–2001.
- Principal investigator: *The Sensitivity of Structure From Motion: A Comprehensive Theoretical and Experimental Study*. NSF, 1999–2002.
- Co-investigator: *Immersive Television*. Sony-Intel-Interval, 1998–2001.

- Principal investigator: *Exploring Image Data-Bases Using Novel Similarity Metrics*. NSF, 1997–2000.
- Principal investigator: *A Vision System for American Sign Language Interpretation*. Intel, 1997–2000.
- Co-investigator: *Intelligent Assistants for Joint-Force Crisis-Response*. US Navy MURI, 1996–99.
- Principal Investigator: *From Optical Flow to Image Deformations*. NSF, 1995–98.
- Co-investigator: *Algorithmics of Motion*. MURI. 1995–2002.
- Principal investigator: *Asteroid Shape Reconstruction from Remote Images*. JPL 1995.
- Principal Co-investigator: *The Multilinear Tensor in Image Sequence Analysis*. US-Israel BSF, 1995–98.
- Principal Co-investigator: *Robust Visual Detection and Recognition of Moving Objects in Real Time*. STTR, 1995. With J. B. Burns, Teleos Research.
- Principal Co-investigator: *Remote Intelligent Observer*. NSF-CONACyT, 1995–97.
- Principal Co-investigator: *Autonomous Intelligent Observer*. STTR ARPA, 1994.
- Principal investigator: *Image Representations for Browsing and Retrieval*. ARPA, 1994–98.
- Co-investigator: *CISE Research Instrumentation Grant*, NSF, 1994.
- Principal investigator: *The Factorization Method for Image Sequence Analysis*. NSF, 1992–95.
- Co-investigator: *Research in Mobile Autonomous Robotic Motion, Sensing, and Planning in Unstructured Environments*. NSF, 1992.

## Patents

- S. B. Gokturk, C. Tomasi, B. Acar, C. F. Beaulieu, D. S. Paik, and S. A. Napel. Three-dimensional pattern recognition method to detect shapes in medical images. United States Patent 7,346,209, March 18, 2008.
- S. B. Gokturk and C. Tomasi and F. Surucu and A. Rafii. Gesture recognition system using depth perceptive sensors. United States Patent 7,340,077 B2, March 4, 2008.
- S. B. Gokturk and C. Tomasi and F. Surucu. Optical methods for remotely measuring objects. United States Patent 7,310,431, December 18, 2007.
- B. Acar, C. F. Beaulieu, S. B. Gokturk, C. Tomasi, D. S. Paik, R. Brooke Jeffrey, and S. A. Napel. Method for detecting and classifying a structure of interest in medical images. United States Patent 7,272,251, September 18, 2007.
- C. Tomasi and S. B. Gokturk. Method and apparatus for approximating depth of an object's placement onto a monitored region with applications to virtual interface devices. United States Patent 7,050,177, May 23, 2006 and United States Patent 7,006,236, February 28, 2006.
- C. Tomasi and A. Rafii. Quasi-three-dimensional method and apparatus to detect and localize interaction of user-object and virtual transfer device. United States Patent 6,710,770, March 23, 2004.
- C. Tomasi and F. Surucu. Method and apparatus for approximating a source position of a sound-causing event for determining an input used in operating an electronic device. United States Patent 6,690,618, February 10, 2004.

- S.B. Gokturk, C. Tomasi, B. Acar, C.F. Beaulieu, S. Napel, D.S. Paik. Shape Recognition Method to Differentiate Normal and Abnormal Anatomical Shapes. Patent S01-264/US filed September 30, 2003.
- S. B. Gokturk, C. Tomasi, F. Surucu and A. Rafi. Gesture recognition system using depth perceptive sensors. USPTO Application 20030156756 under review, August 21, 2003.
- F. Surucu and C. Tomasi. Detecting, classifying, and interpreting input events based on stimuli in multiple sensory domains. USPTO Application 20030132950 under review, July 17, 2003.
- I. H. Torunoglu, J. D. Spare, M. Van Meter, S. M. Shivji, C. Bamji, and C. Tomasi. Portable sensory input device. USPTO Application 20030132921 under review, July 17, 2003.

## Publications

- S. Gu and C. Tomasi. Phase diffusion for the synchronization of heterogeneous sensor streams. *IEEE International Conference on Acoustics, Speech, and Signal Processing*, to appear, 2009.
- T. Jiang and C. Tomasi. Robust shape normalization based on implicit representations. *International Conference on Pattern Recognition*, December, 2008.
- T. Jiang and C. Tomasi. Finite-element level-set curve particles. *ICCV Workshop on Non-rigid Registration and Tracking through Learning*, pages 1–8, October, 2007.
- C. Tomasi. Global stereo in polynomial time. In L. Harris and M. Jenkin, editors. *Computational Vision in Neural and Machine Systems*, Cambridge University Press, pages 203–219, 2007.
- T. Jiang, C. Tomasi, and S. C. Schmidler. How to dispatch observers to track a moving boundary. *First ACM/IEEE International Conference on Distributed Smart Cameras*, pages 305–312, September 2007.
- J. M. Phillips, R. Liu, and C. Tomasi. Outlier Robust ICP for Minimizing Fractional RMSD. *6th International Conference on 3-D Digital Imaging and Modeling*, pages 427–434, August 2007.
- S. T. Birchfield, B. Natarajan, and C. Tomasi. Correspondence as energy-based segmentation. *Image and Vision Computing*, Vol. 25, No. 8, pages 1329–1340, August 2007.
- T. Jiang and C. Tomasi. Level-set curve particles. *European Conference on Computer Vision (ECCV)*, pages 633–644, 2006.
- C. Schmid, S. Soatto and C. Tomasi, editors. *IEEE Computer Society Conference on Computer Vision and Pattern Recognition*. IEEE Computer Society Press, Los Alamitos, CA, 2005.
- M. Fashing and C. Tomasi. Mean shift is a bound optimization. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, Vol. 27, No. 3, pages 471–474, March 2005.
- M. H. Lin and C. Tomasi. Surfaces with occlusions from layered stereo. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, Vol. 26, No. 8, pages 1073–1078, August 2004.
- P. Venkatesan, A. Gupte, C. Tomasi, and J. M. Grichnik. Center-based approach for computerized analysis of non-uniform growth patterns in melanocytic lesions. (Abstract) *The Journal of Investigative Dermatology* 122(3), page A158, March 2004.
- C. Tomasi. Past Performance and Future Results. *Nature* 408, page 378, March 2004.
- S. B. Göktürk and C. Tomasi. 3D Head Tracking Based on Recognition and Interpolation Using a Time-Of-Flight Depth Sensor. *Proceedings of the IEEE Computer Society Conference Computer Vision and Pattern Recognition, CVPR*, San Diego, CA, pages 211–217, June 2004.

- D. Russakoff, C. Tomasi, T. Rohlfling and C. Maurer. Image Similarity Using Mutual Information of Regions. *The 8th European Conference on Computer Vision - ECCV 2004*, Prague, Czech Republic, pages 596–607, May 2004.
- C. Tomasi, S. Petrov and A. Sastry. 3D tracking = classification + interpolation. *International Conference on Computer Vision (ICCV)*, pages 1441–1448, Nice, France, October 2003.
- C. Tomasi, A. Raffi and I. Torunoglu. Full-size projection keyboard for handheld devices. *Communications of the ACM*, 46(7), pages 70–75, July 2003.
- M. Lin and C. Tomasi. Surfaces with occlusions from layered stereo. *Proceedings of the IEEE Computer Society Conference on Computer Vision and Pattern Recognition (CVPR)*, pages 710–717, Madison, WI, June 2003.
- H. Roeber and J. Bacus and C. Tomasi. Typing in thin air: the Canesta projection keyboard — A new method of interaction with electronic devices. *Proceedings of the Conference on Human Factors in Computing Systems (CHI 2003)*, pages 712–713, Fort Lauderdale, FL, April 2003.
- B. Acar, C. F. Beaulieu, S. B. Göktürk, C. Tomasi, D. S. Paik, R. B. Jeffrey, Jr., J. Yee, and S. Napel. Edge Displacement Field Based Classification for Improved Detection of Polyps in CT Colonography. *IEEE Transactions on Medical Imaging*, 21(12), pages 1461–1467, December 2002.
- T. Zhang and C. Tomasi. On the Consistency of Instantaneous Rigid Motion Estimation. In *International Journal on Computer Vision*, 46(1), January 2002, pages 51–79.
- B. Göktürk, C. Tomasi, B. Acar, C. Beaulieu, D. Paik, R. Brooke Jeffrey, J. Yee, and S. Napel. A statistical 3D pattern processing method for computer aided detection of polyps in CT colonography. *IEEE Transactions on Medical Imaging*, 20(12), December 2001, pages 1251–1260.
- S. B. Göktürk and C. Tomasi. A New 3-D Pattern Recognition Technique With Application to Computer Aided Colonoscopy. In *Proceedings of the IEEE Computer Science Conference on Computer Vision and Pattern Recognition (CVPR)*, pages (1)93–100, Kauai, Hawaii, 2001.
- J. Hornegger and C. Tomasi. Image Warping for 3-D Reconstruction: Robustness and Efficiency. In *Bildverarbeitung für die Medizin*, pages 109–113, March 2001.
- Y. Rubner and C. Tomasi. *Perceptual Metrics for Image Database Navigation*. Book: Kluwer Academic Publishers, Boston, MA, 2001.
- Y. Rubner, J. Puzicha, C. Tomasi, and J. M. Buhmann. Empirical Evaluation of Dissimilarity Measures for Color and Texture. *Computer Vision and Image Understanding Journal*, 84(1):25-43, October 2001.
- M. A. Ruzon and C. Tomasi. Edge, Junction, and Corner Detection Using Color Distributions. In *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 23(11), November 2001, pages 1281–1295.
- B. Göktürk, C. Tomasi, B. Acar, D. Paik, C. Beaulieu, and S. Napel. A Learning Method for Automated Polyp Detection. In *Proceedings of the Medical Image Computing and Computer-Assisted Intervention Conference (MICCAI)*, Utrecht, The Netherlands, October 2001, pages 85–93.
- B. Acar, S. Napel, D. Paik, B. Göktürk, C. Tomasi, and C. Beaulieu. Using optical flow fields for polyp detection in virtual colonoscopy. In *Proceedings of the Medical Image Computing and Computer-Assisted Intervention Conference (MICCAI)*, Utrecht, The Netherlands, October 2001, pages 637–644.
- B. Acar, C. Beaulieu, D. Paik, B. Göktürk, C. Tomasi, J. Yee, and S. Napel. Assessment of an optical flow field-based polyp detector for CT colonography. In *Proceedings of the 23rd Annual International*

Conference of the IEEE Engineering in Medicine and Biology Society, Istanbul, Turkey, October 2001.

- Y. Rubner and C. Tomasi and L. J. Guibas. The Earth Mover's Distance as a Metric for Image Retrieval. In *International Journal of Computer Vision*, 40(2) November 2000, pages 99–121.
- C. Tomasi and S. Burak Göktürk. A graph method for the conservative detection of polyps. *2nd International Symposium on Virtual Colonoscopy*, Boston, MA, October 2000, page 105.
- C. Tomasi. Early vision. In *Encyclopedia of Cognitive Sciences*, London, England, 2002. Nature Publishing Group, Macmillan Reference Limited.
- M. A. Ruzon and C. Tomasi. Alpha Estimation in Natural Images. In *Proceedings of the IEEE Computer Science Conference on Computer Vision and Pattern Recognition (CVPR)*, pages (1)24-31, Hilton Head Island, SC, June 2000.
- S. Birchfield and C. Tomasi. Depth discontinuities by pixel-to-pixel stereo. *International Journal on Computer Vision*, 35(3), December 1999, pages 269–293.
- C. Tomasi, J. Zhang and G. Golub. A resampling method for computer vision. In *Proceedings of the Ninth International Symposium on Robotics Research, ISRR '99*, Snowbird, CO, October 1999, pages 89–96. Invited paper.
- R. Manduchi and C. Tomasi. Distinctiveness maps for image matching. In *10th International Conference on Image Analysis and Processing (ICIAP)*, Venice, Italy, September 1999, pages 26–31.
- C. Tomasi and J. Zhang. How to rotate a camera. In *10th International Conference on Image Analysis and Processing (ICIAP)*, Venice, Italy, September 1999, pages 606–611.
- S. Birchfield and C. Tomasi. Multiway cut for stereo and motion with slanted surfaces. In *Seventh International Conference on Computer Vision (ICCV)*, Kerkyra, Greece, September 1999, pages 489–495.
- J. Hornegger and C. Tomasi. Representation issues in the ML estimation of camera motion. In *Seventh International Conference on Computer Vision (ICCV)*, Kerkyra, Greece, September 1999, pages 640–647.
- Y. Rubner and C. Tomasi. Texture-based image retrieval without segmentation. In *Seventh International Conference on Computer Vision (ICCV)*, Kerkyra, Greece, September 1999, pages 1018–1024.
- M. A. Ruzon and C. Tomasi. Corner detection in textured color images. In *Seventh International Conference on Computer Vision (ICCV)*, Kerkyra, Greece, September 1999, pages 1039–1045.
- J. Puzicha, Y. Rubner, C. Tomasi, and J. M. Buhmann. Empirical evaluation of dissimilarity measures for color and texture. In *Seventh International Conference on Computer Vision (ICCV)*, Kerkyra, Greece, September 1999, pages 1165–1172.
- M. A. Ruzon and C. Tomasi. Color edge detection with the compass operator. In *Proceedings of the IEEE Computer Science Conference on Computer Vision and Pattern Recognition (CVPR)*, pages II-160–166, Fort Collins, CO, June 1999.
- T. Zhang and C. Tomasi. Fast, robust, and consistent camera motion estimation. In *Proceedings of the IEEE Computer Science Conference on Computer Vision and Pattern Recognition (CVPR)*, pages I-164–170, Fort Collins, CO, June 1999.
- S. Birchfield and C. Tomasi. A Pixel Dissimilarity Measure That Is Insensitive to Image Sampling. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 20(4), pages 401–406, April 1998.
- Y. Rubner and C. Tomasi. Texture Metrics. *IEEE International Conference on Systems, Man, and Cybernetics*, San Diego, CA, October 1998, pages 4601–4607.

- H. H. González-Baños, L. Guibas, J. C. Latombe, S. M. LaValle, D. Lin, R. Motwani, and C. Tomasi. Motion Planning with Visibility Constraints: Building Autonomous Observers. *Proceedings of the Eighth International Symposium on Robotics Research*, Hayama, Japan, October 3-7, 1998, pp. 95–101. Invited paper.
- C. Tomasi and R. Manduchi. Stereo Matching as a Nearest-Neighbor Problem. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 20(3), pages 333–340, March 1998.
- Y. Rubner, C. Tomasi and L. J. Guibas. Adaptive Color-Image Embeddings for Database Navigation. *Proceedings of the Third Asian Conference on Computer Vision*, Hong Kong, pages 104–111, January 1998.
- J. Salas and J. L. Gordillo and C. Tomasi. Visual Routines for Mobile Robots. *Expert Systems with Applications*, Pergamon Press, volume 14 (1-2), January 1998, pages 187–197.
- C. Tomasi and R. Manduchi. Bilateral Filtering for Gray and Color Images. *Proceedings of the Sixth International Conference on Computer Vision (ICCV)*, Bombay, India, pp. 839–846, January 1998.
- Y. Rubner and C. Tomasi and L. Guibas. A Metric for Distributions with Applications to Image Databases. *Proceedings of the Sixth International Conference on Computer Vision (ICCV)*, Bombay, India, pp. 59–66, January 1998.
- S. Birchfield and C. Tomasi. Depth Discontinuities by Pixel-to-Pixel Stereo. *Proceedings of the Sixth International Conference on Computer Vision (ICCV)*, Bombay, India, pp. 1073–1080, January 1998.
- I. R. Nourbakhsh and D. Andre and C. Tomasi and M. R. Genesereth. Mobile Robot Obstacle Avoidance Via Depth From Focus. *Robotics and Autonomous Systems Journal*, Elsevier, volume 22, number 2, pages 151–158, November 1997.
- C. Tomasi and J. Shi. Image Deformations Are Better Than Optical Flow. *Mathematical and Computer Modelling Journal*, 24 (5/6), pp. 165–175, November 1996.
- T. Y. Tian, C. Tomasi, and D. J. Heeger. Comparison of approaches to egomotion computation. *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, San Francisco, CA, June 1996, pp. 315–320.
- C. Tomasi and R. Manduchi, Stereo Without Search. *European Conference on Computer Vision (ECCV)*, Cambridge, UK, April 1996, volume I, pp. 452–465.
- C. Tomasi and J. Zhang. Is Structure-From-Motion Worth Pursuing? *Proceedings of the Seventh International Symposium on Robotics Research, ISRR '95*, Herrsching, Germany, October 1995, pages 391–400. Invited paper.
- C. Tomasi and J. Zhang and D. Redkey. Experiments With a Real-Time Structure-From-Motion System. *Proceedings of the Fourth International Symposium on Experimental Robotics, ISER '95*, Stanford, CA, June 1995, pp. 123–128.
- C. Becker and H.H. González-Baños and J.C. Latombe and C. Tomasi. An Intelligent Observer. *Proceedings of the Fourth International Symposium on Experimental Robotics, ISER '95*, Stanford, CA, June 1995, pp. 94–99.
- D. Weinshall and C. Tomasi. Linear and Incremental Acquisition of Invariant Shape Models from Image Sequences. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 17(5), May 1995, pp. 512–517. Also appears in the Fourth International Conference on Computer Vision, Berlin, Germany, May 1993, pp. 675–682, and as IBM computer science technical report RC18549 (# 81133), T.J. Watson Research Center, Yorktown Heights, NY, November 1992.

- L. Guibas and B. Rogoff and C. Tomasi. Fixed-Window Image Descriptors for Image Retrieval. *Proceedings of the SPIE Conference on Storage and Retrieval for Image and Video Databases*, pages 2420–2431. San Josè, CA, February 1995.
- C. Tomasi. Pictures and Trails: a New Framework for the Computation of Shape and Motion From Perspective Image Sequences. *IEEE Conference on Computer Vision and Pattern Recognition*, Seattle, WA, June 1994, pages 913–918.
- J. Shi and C. Tomasi. Good Features To Track. *IEEE Conference on Computer Vision and Pattern Recognition*, Seattle, WA, June 1994, pages 593–600.
- C. Tomasi and T. Kanade. Shape and Motion from Image Streams – A Factorization Method. *Proceedings of the National Academy of Sciences of the United States of America*. Washington, DC, Volume 90, Issue 21, pages 9795–9802, November, 1993.
- C. Tomasi. Input Redundancy and Output Observability in the Analysis of Visual Motion. *Sixth International Symposium on Robotics Research*, Pittsburgh, PA, October 1993, pages 213–222. Invited paper.
- C. Tomasi and J. Shi. Direction of Heading From Image Deformations. *IEEE Conference on Computer Vision and Pattern Recognition*, New York, NY, June 1993, pages 422–427.
- C. Tomasi and T. Kanade. Shape and Motion from Image Streams under Orthography: a Factorization Method. *International Journal on Computer Vision*, 9(2), pages 137–154, November 1992.
- C. Tomasi and T. Kanade. Factoring image sequences into shape and motion. *Proceedings of the IEEE Workshop on Visual Motion*, pages 21–28, Princeton, NJ, October 1991.
- C. Tomasi and T. Kanade. Shape and motion without depth. In *Proceedings of the Third International Conference on Computer Vision (ICCV)*, Osaka, Japan, December 1990, pages 91–95. Also appears in the *Proceedings of the DARPA Image Understanding Workshop*, pages 258–270, Pittsburgh, Pa, September 1990, and as technical report CMU-CS-90-128, Carnegie Mellon University, Pittsburgh, Pa, May 1990.