

CURRICULUM VITAE

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ACADEMIC QUALIFICATIONS: B.Surv. (University of Melbourne, 1975)
M.Surv.Sc. (University of Melbourne, 1977)
Ph.D. (City University, London, 1981)

CURRENT APPOINTMENTS

Professor of Measurement Science, School of Mathematical and Geospatial Sciences, RMIT University, GPO 2476, Melbourne 3001, Victoria, Australia. (May 2003 - continuing)

Associate Dean (Program Quality), College of Science, Engineering and Health, RMIT University, GPO 2476, Melbourne 3001, Victoria, Australia. (May 2003 – May 2011)

PREVIOUS APPOINTMENTS

Acting Dean (Academic Development), Science, Engineering and Technology Portfolio, RMIT University. (February 2006 – March 2008)

Assistant Dean (Computing and Multimedia), Faculty of Engineering, University of Melbourne, Victoria 3010, Australia. (Secondment January 1998 – May 2003)

Associate Professor, Department of Geomatics, University of Melbourne. (January 1995 – April 2003)

Senior Lecturer, Department of Surveying and Land Information, University of Melbourne. (July 1991 - December 1994)

National Science Foundation Research Fellow, NASA Langley Research Center, Virginia, USA (July 1988 - June 1989)

Lecturer (Limited Tenure and Continuing), Department of Surveying and Land Information, University of Melbourne. (January 1984 - June 1991)

University of Melbourne Research Fellow, Department of Surveying, University of Melbourne. (May 1981 - December 1983)

Research Fellow, Department of Civil Engineering, City University, London. (July 1977 - December 1980)

REFEREES

Professor G. L. Benwell, Department of Information Science, University of Otago, P.O. Box 56, Dunedin, New Zealand.

Emeritus Professor J. G. Fryer, Department of Civil, Surveying and Environmental Engineering, University of Newcastle, Newcastle, New South Wales, 2308, Australia.

Emeritus Professor I. P. Williamson, Department of Infrastructure Engineering, The University of Melbourne, Parkville, Victoria, 3010, Australia.

RESEARCH

Research Experience

Research in Analytical and Digital Photogrammetry

High precision multi-station close-range photogrammetry applied to engineering surveillance, structural deformation monitoring, industrial metrology and inspection for the aerospace and manufacturing industries. Video metrology for industrial applications, tracking of aerospace models in wind tunnels and stereo-video systems for asset and environmental mapping from mobile platforms. Self calibrating and free network adjustments for geodetic and photogrammetric least squares solutions. Digital mapping and graphic display of three dimensional surface models. Computer based predictions and reductions for astronomical field observations. Computer based sun shadow plotting for land planning and management. Analysis of inclinometer data acquired for bore-holes. Photogrammetric mapping at large scales from low altitude metric photogrammetry.

Special Studies Program at NASA Langley Research Center, Hampton, Virginia, U.S.A. (1988-1989)

The techniques of targeted test range, plumb line and self calibration of cameras used for industrial photogrammetry were investigated to optimise the accuracy and precision of camera calibration parameters. Procedures were established for the optimal calibrations of large format metric cameras and small format CCD cameras using combinations of the three techniques. A number of additional parameter sets were investigated for the enhancement of the accuracies of the parameters. Polynomials describing the unflatness of the focal planes of the large format cameras and affinity plus empirical terms describing image deformations for the CCD sensors were found to be the most effective.

Special Studies Program in U.S.A, England and Switzerland (1996)

A programme of visits to NASA, City University, London and iMetric SA in Switzerland. The visit to NASA continued collaborative research into video-based tracking of targeted aerospace models in wind tunnels. The visit to City University concentrated on algorithmic aspects of photogrammetric networks. Research at iMetric was particularly valuable as it is a small company specialising in digital photogrammetric inspection systems for the aerospace industry. An extended program of calibration stability testing for online systems was complimented by research into calibration models for cameras used in offline systems.

Contract and Consulting Work

1977-1980: Photogrammetrist/Surveyor in the Terrestrial Photogrammetric Unit, City University, London. Geodetic and photogrammetric surveys carried out for structural monitoring, architectural recording, rescue archaeology and industrial quality control. Consultant to private industry for computer aided acquisition and processing of photogrammetric data.

1981-2003: Photogrammetrist/Computer Consultant in the Department of Geomatic Engineering, University of Melbourne. Geodetic, photogrammetric and video metrology surveys carried out for structural and deformation monitoring, industrial quality control and the surveillance of engineering constructions. Photogrammetric surveys carried out for the recording of monument architecture, archaeological artefacts and biological specimens. Consultant to private surveying/photogrammetric companies for the configuration and programming of computer systems.

Overseas projects and consulting 1981-2008: Computer systems and surveying software consulting and development, Chulalongkorn University, Bangkok; Photogrammetric surveys for reverse engineering of flight deck simulators, Jakarta, Indonesia; Wind tunnel videometric tracking development and implementation, NASA Langley Research Centre, Virginia, U.S.A.; Digital photogrammetric measurement of hydro-electric power station inlet tubes, Hirakud Dam, India. Marine science applications of underwater stereo-video systems, Universita del Salento, Italy.

Selected Research and Development Grants

<i>Source</i>	<i>Research</i>	<i>Year</i>	<i>Value</i>
Australian Research Council	Pattern recognition and image analysis for close range photogrammetry	1988	\$26,000
		1989	\$25,000
		1990	\$28,000
University of Melbourne	Major equipment grant: Analytical Photogrammetric System	1989	\$80,000
University of Melbourne	Major equipment grant: Automated Theodolite Measuring System	1991	\$116,000
Australian Research Council (with Leahy and Collier)	Precise kinematic positioning	1992	\$45,000
		1993	\$42,000
		1994	\$43,000
Australian Research Council	Dam surveillance using digital photogrammetry	1992	\$21,000
		1993	\$21,000
Australian Research Council	Infrastructure Mechanism C: Spatially referenced digital images	1993	\$311,000
		1994	\$50,000
University of Melbourne	Major equipment grant: Spatially referenced digital images	1993	\$179,000
Australian Research Council (with Fraser)	Vision metrology system development	1994	\$63,000
		1995	\$63,000
		1996	\$63,000
Australian Research Council (with Fraser)	Development of a still video vision metrology system for dimensional inspection in aircraft manufacturing	1995	\$24,000
		1996	\$21,000
		1997	\$19,500
University of Melbourne	Major equipment grant: Stereo digital photogrammetric system	1997	\$84,000
University of Melbourne	Small ARC: Underwater stereo-video system calibration	1998	\$20,000
AFMA (CI: Harvey, UWA)	MIRF Grant: Validation of the accuracy and precision of in situ length measurements of Southern Bluefin Tuna by stereo-video	2001	\$62,000
AFMA (CI: Harvey, UWA)	The implementation and validation of a stereo-video system for measuring the length of Southern Blue Fin Tuna during transfers	2000	\$62,000
		2002	\$46,000
		2003	\$106,000
		2004	\$12,000
		2005	\$141,000
FRDC (CI: Harvey, UWA)	Characterising the fish habitats in the Recherche Archipelago, Western Australia	2002	\$146,000
		2003	\$131,000
		2004	\$125,000
University-CSIRO Collaborative Grant	Automated analysis of seabed and water column communities using stereo-video	2003	\$25,000
		2004	\$25,000
Coastal Zone, Estuary and Waterway Management CRC (CI: Kendrick, UWA)	Rapid and cost effective assessment of shallow water marine benthic habitats	2006	\$300,000
Royal Academy of Engineering, U.K.	Distinguished Visiting Fellowship Scheme Award	2011	GBP4855
School Capex Grant	High speed 3D optical tracking system	2011	\$115,000
ARC Linkage (CI: Harvey, UWA)	Automation of species recognition and size measurement of fish from underwater stereo-video imagery	2011	\$76,500
		2012	\$148,000
		2013	\$141,500
		2014	\$70,000

Graduate Research Supervision

G. J. Hunter	Non-current data and land information systems M.Surv.Sc awarded 1987
C. J. Hall	Design procedures for close range photogrammetry M.Surv.Sc. awarded 1989
G. W. Oaten	Multiple representations for spatial information and analysis: an object oriented approach, M.Surv.Sc. awarded 1991
M. J. Hentschel	Calibration of aerial cameras under operational conditions M.Surv.Sc. awarded 1991
P. G. Joyce	Optimisation of three dimensional triangulated irregular networks M.Surv.Sc. awarded 1992
S. Madiraju	Edge matching using artificial intelligence techniques M.Eng.Sc. awarded 1993
I. Trisirisatayawong	Automatic feature extraction from scanned data as input to GIS Ph.D. awarded 1995
G. Ganci	Industrial quality control using video theodolites Part time M. Surv. Sc. Commenced 1995, discontinued 1997 (employment)
A. S. Homainejad	Real time photogrammetry processing Ph.D. awarded 1997
E. S. Harvey	Underwater video as a tool in conservation management of marine biological resources, Ph.D. awarded 1998
W. Zhang	A parametric approach to spatio-temporal information systems Full time Ph.D. commenced 1997 (temporary supervision 1998-1999)
W. S. Ye	A 3D cadastral property system for high-rise apartment complexes Full time Ph.D. commenced 1997 (temporary supervision 1998-1999)
T. H. Han	World wide web based digital elevation modelling Part time Dip.GIS awarded 2001
K. J. Baxter	Reconciliation, modelling and prediction of sea floor terrain and marine habitat characteristics in the Recherche Archipelago, Western Australia Full time Ph.D. commenced 2002, discontinued 2004, submitted 2008
R. Onederra	GPS reliability and dynamic calibration Full time M.Geo.Sc. awarded 2005

List of Publications¹

- Shortis, M. R., 1978. Terrestrial photogrammetry for deep archaeological excavations. *Terrestrial Photogrammetry as an Aid to Archaeological Surveying*. The City University, London, 6 pages.
- Cooper, M.A.R. and Shortis, M. R., 1978. Photogrammetric measurement of small components for motor vehicles. *International Archives of Photogrammetry*, Vol. 22 (5): 69-71.
- Cooper, M.A.R. and Shortis, M. R., 1980. Analytical photogrammetry applied to the measurement of large structures. *International Archives of Photogrammetry*, Vol. 23 (5): 137-143.
- * Shortis, M. R., 1981. Computer aided orientations of terrestrial models on the Topocart B. *Photogrammetric Record*, 10(58): 481-491.
- Shortis, M. R., 1982. Sequential adjustments of close-range stereopairs. *International Archives of Photogrammetry*, 24(5): 461-470.
- Shortis, M. R., 1983. Deformation analysis and monitoring by close-range photogrammetry. *Symposium on the Surveillance of Engineering Structures*. Department of Surveying, University of Melbourne, 16 pages.
- * Shortis, M. R., 1983. Computer-aided orientation of terrestrial models on the Topocart B from Jena. *Kompndium Photogrammetrie*, 16: 152-161.
- Shortis, M. R. and Benwell, G. L., 1984. Acquisition of spatial data by survey and photogrammetric techniques. *Australasian Computer Graphics Association Conference*, Melbourne, 7 pages.

¹ The asterisk (*) indicates papers in refereed journals, book chapters or refereed conference papers. The footnote marker (†) indicates invited papers.

9. Shortis, M. R. and Murnane, A. B., 1986. Analysis of inclinometer data acquired from non-vertical boreholes. *Commission 6, 18th International Congress of Surveyors*, Toronto, pp 220-238.
10. Shortis, M. R., Price, L. J., and Turner, P. J., 1986. Photogrammetric Monitoring of the Excavation of a Trunk Sewer Pumping Station. *International Archives of Photogrammetry*, Vol. 26 (5), Ottawa, pp 241-249.
11. † Shortis, M. R., 1986. Applications of close range photogrammetry to structural monitoring and industrial measurement. *CSIRO Symposium on Dimensional Measurement in Precision and Heavy Engineering*, Sydney, pp 203-214.
12. Shortis, M. R. and Adshead, J.F., 1986. Applications of digital data to the MMBW sewage pumping station project. *6th Australian Cartographic Conference*, Melbourne, 9 pages.
13. Shortis, M. R., 1986. Applications of close range photogrammetry to structural monitoring and industrial measurement. *Symposium on Surveillance and Monitoring Surveys*, Department of Surveying, University of Melbourne, pp 212-223.
14. Shortis, M. R. (Editor), 1986. *Symposium on Surveillance and Monitoring Surveys*, Department of Surveying, The University of Melbourne, 349 pp.
15. * Shortis, M. R., 1986. Close range photogrammetric measurements for structural monitoring, deformation surveys and engineering surveillance, *Australian Journal of Geodesy, Photogrammetry and Surveying*, 45: 55-64.
16. Benwell, G.L., Shortis, M. R. and Quick, B.R., 1987. The graphical display of spatial data. *29th Australian Survey Congress*, Perth, pp 329-347.
17. Adshead, J.F., Arnot, P., Shortis, M. R. and Turner, P.J., 1987. Hoppers Crossing pumpwells - An exercise in terrestrial photogrammetry. *13th Engineering and Mining Surveying Conference*, Melbourne, 14 pages.
18. Shortis, M. R., 1987. The feasibility of the application of digital imagery to precise close range metrology. *Symposium on the Applications of Close Range Photogrammetry*, Department of Surveying and Land Information, The University of Melbourne, pp 32-48.
19. Shortis, M. R., 1987. Precise monitoring of large engineering structures using close range photogrammetry. *Symposium on the Applications of Close Range Photogrammetry*, Department of Surveying and Land Information, The University of Melbourne, pp 58-75.
20. Adshead, J.F., Shortis, M. R. and Turner, P.J., 1987. Close range photogrammetric mapping applications for the Western Trunk Sewer project. *Symposium on the Applications of Close Range Photogrammetry*, Department of Surveying and Land Information, The University of Melbourne, pp 100-116.
21. Shortis, M. R. (Editor), 1987. *Symposium on the Applications of Close Range Photogrammetry*, Department of Surveying and Land Information, The University of Melbourne, 226 pp.
22. * Shortis, M. R., 1988. Adjustment of survey observations for the computation of Universal Transverse Mercator coordinates. *The Australian Surveyor*, 34(2): 142-152.
23. Shortis, M. R. and Ogleby, C.L., 1988. Applications of low altitude photogrammetry to digital mapping and heritage recording. *International Archives of Photogrammetry and Remote Sensing*, Vol. 27 (5), pp 557-567.
24. Shortis, M. R. and Ogleby, C.L., 1988. Precise monitoring of large engineering structures using close range photogrammetry. *ASPRS Technical Papers, ACSM/ASPRS Fall Convention*, Virginia Beach, pp 19-28.
25. * Shortis, M. R., 1988. Precision evaluations of digital imagery for close range photogrammetric applications. *Photogrammetric Engineering and Remote Sensing*, 54(10): 1395-1401.
26. * Shortis, M. R., Adshead, J.F. and Turner, P.J., 1989. Close range photogrammetric mapping applications for the Western Trunk Sewer project. *The Australian Surveyor*, 34 (6): 535-551.
27. * Shortis, M. R. and Hall, C. J., 1989. Network design methods for close range photogrammetry. *Australian Journal of Geodesy, Photogrammetry and Surveying*, 50: 51-72.
28. † Shortis, M. R., 1989. Industrial photogrammetry at the NASA Langley Research Center. *Symposium on Surveillance and Monitoring Surveys*, University of Melbourne, pp 218-231.
29. * Adshead, J. F., Arnot, P., Shortis, M. R. and Turner, P. J., 1990. Hoppers Crossing pump wells - An exercise in terrestrial photogrammetry. *Surveying Australia*, 12(1): 29-34.

30. Shortis, M. R., 1990. Comparisons of geodetic network adjustments based on geographic and map grid coordinate systems. *Commission 6, 19th International Congress of Surveyors*, Helsinki, 12 pages.
31. Shortis, M. R. and Adams, R. R., 1990. Calibration of a wind tunnel probe. *Commission 6, 19th International Congress of Surveyors*, Helsinki, 8 pages.
32. Oaten, G. W. and Shortis, M. R., 1990. An object oriented approach to analysis for geographic information systems. Volume 2, *Annual Conference of the Urban and Regional Information Systems Association (URISA 90)*, Edmonton, pp 244-255.
33. Burner, A. W., Snow, W. L., Shortis, M. R., and Goad, W. K., 1990. Laboratory calibration and characterization of video cameras. *Close Range Photogrammetry Meets Machine Vision*, SPIE Vol. 1395, pp 664-671.
34. Fraser, C. S. and Shortis, M. R., 1990. A correction model for variation of distortion within the photographic field. *Close Range Photogrammetry Meets Machine Vision*, SPIE Vol. 1395, pp 244-251.
35. Oaten, G. W. and Shortis, M. R., 1990. Geometric elements or thematic features: The quest for basic spatial objects. *Annual Conference of the Australian Urban and Regional Information Systems Association (URPIS 90)*, Canberra, 11 pages.
36. Shortis, M. R. and Fraser, C. S., 1990. A review of close range optical 3D measurement. *16th National Surveying Conference*, Barossa Valley, Australia, 10 pages.
37. † Oaten, G. W. and Shortis, M. R., 1990. Multiple representations for GIS. *1990 University of Otago LIS/GIS Colloquium*, Dunedin, pp 297-310.
38. * Hentschel, M. J. and Shortis, M. R., 1991. Calibration of cameras under operational conditions. *The Australian Surveyor*, 36(1): 61-74.
39. Shortis, M. R. and Judd, A. M., 1991. Applications of CCD cameras to the mining industry. *17th National Surveying Conference*, Albury-Wodonga, Australia, 10 pages.
40. * Shortis, M. R. and Fraser, C. S., 1991. A review of close range optical 3D measurement. *Surveying Australia*, 13(3): 39-46.
41. * Shortis, M. R. and Fraser, C. S., 1991. Current trends in close range optical 3D measurement for industrial and engineering applications. *Survey Review*, 31(242): 188-200.
42. † Shortis, M. R., Burner, A. W., Snow, W. L., and Goad, W. K., 1991. Calibration tests of industrial and scientific CCD cameras. *First Australian Photogrammetric Conference*, Sydney, Australia, November 1991, 11 pages.
43. * Fraser, C. S. and Shortis, M. R., 1992. Variation of distortion within the photographic field. *Photogrammetric Engineering and Remote Sensing*, 58 (6): 851-855.
44. * Shortis, M. R. and Joyce, P. G., 1992. Accuracy and precision of volumes computed from triangulated irregular networks. *Survey Review*, 31(245): 377-389.
45. Shortis, M. R., Ogleby, C.L. and Leahy, F. J., 1992. Expert witness testimony based on photogrammetric evidence. *Commission 5, International Society for Photogrammetry and Remote Sensing 17th Congress*, Washington D.C., 10 pages.
46. * Shortis, M. R., 1992. The use of theodolite intersections to calibrate a wind tunnel probe. *The Australian Surveyor*, 37 (4): 295-301.
47. Snow, W. L., Childers, B. A. and Shortis, M. R., 1993. The calibration of video cameras for quantitative measurements. *39th International Instrumentation Symposium*, Albuquerque, New Mexico, pp. 103-130.
48. * Trisirisatayawong, I. and Shortis, M. R., 1993. A comparison of two feature classification methods for scanned topographic maps. *Cartography*, 22(1): 1-14.
49. * Seager, J. W. and Shortis, M. R., 1993. Linearisation without calculus - a network adjustment example. *The Australian Surveyor*, 38(3): 197-203.
50. Judd, A. M., Leahy, F. J. and Shortis, M. R., 1993. Rapid rail mapping with GPS and other sensors. *Satellite Navigation Technology Conference*, University of New South Wales, Australia, pp 85-96.
51. Thompson, M. W., Shortis, M. R. and Hall, C. J., 1993. An investigation of the use of digital close range photogrammetry in the monitoring of large scale engineering structures. *IEMS Surveying Seminar*, Portland, Australia, August 1993, 22 pages.

52. Shortis, M. R., Snow, W. L., Childers, B. A. and Goad, W. K., 1993. The influence of storage media on the accuracy and repeatability of photogrammetric measurements using CCD cameras. *Videometrics II*, SPIE Vol. 2067, pp 80-92.
53. Leahy, F. J., Judd, A. M. and Shortis, M. R., 1993. Measurement of railway profiles using GPS and integrated with other sensors. *4th Vehicle Navigation and Information Systems Conference*, Ottawa, Canada, pp 706-709.
54. Trisirisatayawong, I. and Shortis, M. R., 1993. Automatic recognition of cartographic objects by the invariant moment method. *Advances in Urban Spatial Information Analysis*, Wuhan, China, October 1993, pp 180-189.
55. Fryer, J. G. and Shortis, M. R. (Editors), 1994. *Close Range Techniques and Machine Vision*. Australian Photogrammetry and Remote Sensing Society, Melbourne, Australia. 495 pages.
56. Childers, B. A., Snow, W. L., Jones, S. B., Franke, J. M. and Shortis, M. R., 1994. Support of wake vortex detection research in flight and wind tunnel testing using videometric techniques. *International Archives of Photogrammetry and Remote Sensing*, Vol. 30 (5), pp 41-46.
57. Fraser, C. S. and Shortis, M. R., 1994. Vision metrology in industrial inspection: A practical evaluation. *International Archives of Photogrammetry and Remote Sensing*, Vol. 30 (5), pp 87-91.
58. Shortis, M. R., Thompson, M. W. and Hall, C. J., 1994. An application of digital close range photogrammetry to the monitoring of large scale engineering structures. *International Archives of Photogrammetry and Remote Sensing*, Vol. 30 (5), pp 365-373.
59. Stirling, D. M., Bridger, A. M. and Shortis, M. R., 1994. Photogrammetric modelling of a commuter airliner flight deck for reverse engineering purposes. *International Archives of Photogrammetry and Remote Sensing*, Vol. 30 (5), pp 374-381.
60. † Shortis, M. R. and Fraser, C. S., 1994. Photogrammetric industrial inspection using a still video camera. *Still Photography?*, Melbourne, Australia, 10 pages.
61. * Shortis, M. R. and Seager, J. W., 1994. The use of geographic and map coordinate systems for geodetic network adjustments. *Survey Review*, 32(254): 495-511.
62. Childers, B. A., Snow, W. L. and Shortis, M. R., 1994. Videometric system using VITC for computer-aided image management. *Videometrics III*, SPIE Vol. 2350, pp 93-98.
63. Shortis, M. R., Clarke, T. A. and Short, T., 1994. A comparison of some techniques for the subpixel location of discrete target images. *Videometrics III*, SPIE Vol. 2350, pp 239-250.
64. † Fraser, C. S. and Shortis, M. R., 1994. Industrial inspection using a still video camera. *Resource Technology '94*, Melbourne, Australia, pp 362-375.
65. * Shortis, M. R. and Trisirisatayawong, I., 1994. Automatic text recognition and the potential for text to feature association on scanned maps. *Australian Journal of Geodesy, Photogrammetry and Surveying*, 61:85-100.
66. Trisirisatayawong, I. and Shortis, M. R., 1995. Automatic map feature extraction using artificial neural networks. Volume 4 (AutoCarto 12), *ACSM/ASPRS Annual Convention and Exhibition Technical Papers*, Charlotte, North Carolina, pp 375-384.
67. Shortis, M. R., Snow, W. L. and Goad, W. K., 1995. Comparative geometric tests of industrial and scientific CCD cameras using plumb line and test range calibrations. *ISPRS Intercommission Workshop "From Pixels to Sequences"*, Zurich, Switzerland, pp 53-59.
68. Homainejad, A.S. and Shortis, M. R., 1995. Development of a new target template for automatic stereo matching. *ISPRS Intercommission Workshop "From Pixels to Sequences"*, Zurich, Switzerland, pp 318-322.
69. * Fraser, C.S. and Shortis, M. R., 1995. Metric exploitation of still video imagery. *The Photogrammetric Record*, 15(85): 107-122.
70. Shortis, M. R. and Snow, W. L., 1995. Calibration of CCD cameras for field and frame capture modes. *Conference on Digital Photogrammetry and Remote Sensing '95*, SPIE Vol. 2646, pp. 2-14.
71. Ganci, G. and Shortis, M. R., 1995. The use of digital photogrammetry for large scale metrology. Volume 1, *5th South East Asian and 36th Australian Surveyors Congress*, Singapore, pp 247-261.
72. Homainejad, A.S. and Shortis, M. R., 1995. The implementation of an automatic stereo matching for digital photogrammetry. *21st National Surveying Conference*, Hobart, Australia.

73. † Fraser, C. S., Shortis, M. R. and Ganci, G., 1995. Multi-sensor system self-calibration. *Videometrics IV*, SPIE Vol. 2598, pp 2-18.
74. Shortis, M. R., Clarke, T.A. and Robson, S., 1995. Practical testing of the precision and accuracy of target image centring algorithms. *Videometrics IV*, SPIE Vol. 2598, pp 65-76.
75. Snow, W. L. and Shortis, M. R., 1995. A rigid body motion analysis system for offline processing of time coded video sequences. *Videometrics IV*, SPIE Vol. 2598, pp 220-232.
76. Homainejad, A.S. and Shortis, M. R., 1995. A stereo vision system for tracking a dynamic object. *Videometrics IV*, SPIE Vol. 2598, pp 264-271.
77. Judd, A. M., Feltham, R. M. and Shortis, M. R., 1995. Mapping roads and other linear features. Proceedings (Paper 02), *ISA Bridging the Gap Conference 95*, Cowes, Australia, 9 pages.
78. Shortis, M. R. and Ogleby, C. L. (Editors), 1995. *3rd Symposium on Surveillance and Monitoring Surveys*, Department of Geomatics, The University of Melbourne, 191 pp.
79. Ganci, G., and Shortis, M. R., 1995. Videometric as-built surveys during the manufacture of a furnace hopper. *3rd Symposium on Surveillance and Monitoring Surveys*, The University of Melbourne, Australia, pp.59-69.
80. Shortis, M. R. and Fraser, C. S., 1995. Dimensional inspection in manufacturing via vision metrology. *6th International Conference on Manufacturing Engineering*, Melbourne, Australia, pp 415-424.
81. Judd, A. M., Shortis, M. R. and Lawley, S., 1995. Data capture technologies and techniques. *23rd Annual Conference of the Australasian Urban and Regional Information Systems Association (AURISA)*, G. J. Hunter (Editor), Melbourne, Australia, pp 243-253.
82. * Shortis, M. R. and Ganci, G., 1995. Alignment of crane rails using a survey network. *Trans Tasman Surveyor*, 1(1): 14-21.
83. * Harvey, E. S. and Shortis, M. R., 1996. A system for stereo-video measurement of sub-tidal organisms. *Marine Technology Society Journal*, 29(4): 10-22.
84. Shortis, M. R. and Beyer, H. A., 1996. Sensor technology for close range photogrammetry and machine vision. In: *Close Range Photogrammetry and Machine Vision*, K. B. Atkinson (Editor). Whittles Publishing, Caithness, U.K. 371 pages.
85. Shortis, M. R., Robson, S. and Short, T., 1996. Multiple focus calibration of a still video camera. *International Archives of Photogrammetry and Remote Sensing*, 31(5): 534-539.
86. Ganci, G. and Shortis, M. R., 1996. A comparison of the utility and efficiency of digital photogrammetry and industrial theodolite systems. *International Archives of Photogrammetry and Remote Sensing*, 31(5): 182-187.
87. * Shortis, M. R. and Johnston, G., 1996. Photogrammetry: An available surface characterisation tool for solar concentrators , 1996. Part 1: Measurement of surfaces. *The Journal of Solar Energy Engineering*, 118(3): 146-150.
88. * Shortis, M. R., 1996. Indian health and safety in the work place (or I survived the black hole of Burla). *The Australian Surveyor*, 41(3): 183-193.
89. * Shortis, M. R. and Snow, W. L., 1997. Videometric tracking of wind tunnel aerospace models at NASA Langley Research Centre. *The Photogrammetric Record*, 15(85): 673-689.
90. Shortis, M. R. and Beyer, H. A., 1997. Calibration stability of the Kodak DCS420 and 460 cameras. *Videometrics V*, SPIE Vol. 3174, pp 94-105.
91. Robson, S. and Shortis, M. R., 1997. Surface characterisation by tracking discrete targets. *Fourth Conference on Optical 3-D Measurement Techniques*, A. Gruen and H. Kahmen (Editors), Wichmann, pp 179-186.
92. * Shortis, M. R. and Johnston, G., 1997. Photogrammetry: An available surface characterisation tool for solar concentrators , 1997. Part 2: Assessment of surfaces. *The Journal of Solar Energy Engineering*, 119(4): 286-291.
93. Shortis, M. R. and Ganci, G., 1997. Calibration stability of digital still cameras for industrial inspection. *International Conference on Measurement Science, Technology and Practice*, Melbourne, Australia, pp 245-250.
94. Shortis, M. R., 1997. Current practices and trends in informatics and multimedia. *UNESCO Regional Workshop on Informatics*, University of Melbourne, Australia, pp 51-53. .

95. Shortis, M. R., Robson, S. and Beyer, H. A., 1998. Extended lens model calibration of digital still cameras. *International Archives Photogrammetry and Remote Sensing* 32(5): 159-164.
96. Shortis, M. R. and Harvey, E. S., 1998. Design and calibration of an underwater stereo-video system for the monitoring of marine fauna populations. *International Archives Photogrammetry and Remote Sensing* 32(5): 792-799.
97. Shortis, M. R. and Fraser, C. S., 1998. State of the art 3D optical measurement systems for industrial and engineering applications. Proceedings, Commission 6, 21st Congress of the International Federation of Surveyors, Brighton, England, pp 272-290.
98. * Harvey, E. S. and Shortis, M. R., 1998. Calibration stability of an underwater stereo-video system: Implications for measurement accuracy and precision. *Marine Technology Society Journal*, 32(2): 3-17.
99. * Robson, S. and Shortis, M. R., 1998. Practical influences of geometric and radiometric image quality provided by different digital camera systems. *Photogrammetric Record*, 16(92): 225-248.
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178. Watkins, S., Abdulrahim, M., Loxton B. J., Segal, R., Thompson, M., Shortis, M. R. and Sheridan, J., 2009. Flight testing of MAVs in replicated atmospheric turbulence. *Proceedings, 3rd European Conference for Aerospace Sciences (EUCASS)*, Paris, France, July 6-9, 2009.
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183. * Watkins S., Thompson M., Shortis M. R., Segal R., Abdulrahim M. and Sheridan J., 2010. An overview of experiments on the dynamic sensitivity of MAVs to turbulence. *The Aeronautical Journal*, 114(1158):485-492.
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186. * Watkins S., Abdulrahim, M., Thompson, M., Shortis M. R. , Segal R. and Sheridan J., 2011. An overview of experiments on the dynamic sensitivity of MAVs to turbulence. Under review for the *AIAA Journal of Aircraft*.
187. * Fleming, J., Mahalinga-Iyer, R., Shortis, M. R., Vuthaluru, H., Ke, X. and Moulton, B., 2011. Biomedical engineering curricula: university trends in Australia and abroad. Submitted to *Higher Education Research and Development*.
188. * Burgess, G, Shortis, M. R. and Scott, P., 2011. Photographic assessment of retroreflective film properties. Under review for the *ISPRS Journal of Photogrammetry and Remote Sensing*.
189. * Burrows, S. and Shortis M. R., 2011. An evaluation of semi-automated, collaborative marking and feedback systems. Under review for the *Australasian Journal of Educational Technology*.
190. * Shortis, M. R. and Burgess, G., 2011. Photogrammetric monitoring of the construction of a solar energy dish concentrator. Submitted to *Photogrammetric Engineering and Remote Sensing*.

TEACHING AND SCHOLARSHIP

Teaching in Degree and Diploma Programs

BSc (Engineering) Courses, The City University and The Polytechnic of Central London (1977 - 1980): Lecturing to undergraduates in all aspects of basic engineering surveying, hydrographic surveying and field astronomy. General tutor to undergraduates and postgraduates in computer programming, surveying and photogrammetry.

BGeom and combined degrees, and Graduate Diploma Courses, University of Melbourne (1981-2002): Lecturing to undergraduates in geodesy, photogrammetry, computer systems, least squares estimation and field astronomy.

BGeom University of Melbourne, final year research project supervision: 1986-2002.

BAppSc (Surveying/Geomatics), RMIT University (2004-continuing): Lecturing to undergraduates in photogrammetry, surveying, least squares estimation and professional practice.

Degree and Diploma Administration (University of Melbourne)

B.Geom. year level course coordinator 1986-1997

B.Geom./B.Sc. course design and coordination 1986-1997

B.Geom. final year research project coordinator 1990-1992

Grad.Dip. (Geom.Sc.) course design and coordination 1990-1995

Short Course Presentations

Optical 3D Coordinate Measurement for Dimensional Inspection in Manufacturing
 Optical 3D Measurement in Automotive Manufacturing
 An Introduction to Digital Photogrammetry
 Survey Network Adjustment using TDVC
 Digital Photogrammetry for Aerospace Metrology

Teaching and Multimedia Development Grant Programs

Review Panel Member, University of Melbourne Teaching and Learning Grants 1997-2002
 Review Panel Member, Melbourne-Monash Teaching and Learning Courseware Development Committee Grants 2000-2003
 Program Leader, Faculty of Engineering Teaching and Learning Grants 2000-2003
 Chair, SET Portfolio Action Research in Teaching and Learning Grants 2006-2007
 Panel Member or Chair, RMIT and SET Portfolio Teaching Awards 2004-2007

Teaching and Multimedia Development Grants Awarded

<i>Source</i>	<i>Research</i>	<i>Year</i>	<i>Value</i>
Miegunyah Foundation (CI: Ogleby)	Teaching Development Grant: Tutorial modules for remote sensing and image processing	1994	\$25,000
University of Melbourne	Teaching and Learning Grant: Simulations for plane surveying	1998	\$40,000
University of Melbourne	Teaching and Learning Grant: Virtual reality environment for survey network design	1999	\$35,000
University of Melbourne	Teaching and Learning Grant: Visualisation of 3D Geometry for Navigation and Positioning	2000	\$38,000
University of Melbourne (CI: Kealy)	Teaching and Learning Grant: Multimedia Environment for Satellite Positioning and Integrated Systems	2001	\$47,000
HP Teaching Grant	Mobile technology for intelligent collaboration	2004	\$200,000
RMIT LTIF Grant (CI: Gregory)	Engineering First Year Common Course on Professional Development	2007	\$41,000
RMIT LTIF Grant	Semi-automated, collaborative marking and feedback system	2007 2008 2010	\$17,000 \$8,000 \$25,000
ALTC Competitive Grant (CI: Moulton)	Double degrees: research pathways, enabling cross-disciplinarity, and enhancing international competitiveness	2009 2010	\$70,000 \$30,000
SPLINT Teaching Fellowship (University of Nottingham, U.K.)	Foundation Module for Close-Range Photogrammetry	2010	\$12,000

AWARDS AND SCHOLARSHIPS

1972-1975 Commonwealth University Scholarship.
 1973 H.B. Howard Smith Exhibition - Surveying 1 Prize.
 1974 Surveying Exhibition - Surveying 2 Prize.
 1974 Victorian Photogrammetry Society Award - Photogrammetry 1 Prize.
 1975 Institution of Surveyors, Australia (Victoria Division) Award - B.Surv. Prize.
 1976-1977 University of Melbourne Postgraduate Scholarship.
 1977-1980 The City University Research Fellowship Scheme Award.
 1981-1983 The University of Melbourne Research Fellowship.
 1988 Talbert Abrams Award Honorable Mention from the American Society for Photogrammetry and Remote Sensing.

1988-1989 National Research Council of U.S.A. Senior Research Associateship Award.
1991 R. D. Steele Prize, Australian Surveyor.
1996 ISPRS Commission V Prize, XVIII ISPRS Congress, Vienna, Austria.
2004 Best Paper Award from the American Society of Mechanical Engineers for the ISEC 2004 Conference
2008 Thornton-Smith Gold Medal

PROFESSIONAL AFFILIATIONS AND SOCIETY MEMBERSHIPS

Current

Fellow of the Royal Institute of Chartered Surveyors
Surveying and Spatial Sciences Institute of Australia Member.
Photogrammetric Society (U.K.) Member.
Conference Chair, SPIE Videometrics.
Technical Program Director and Committee Member, XXII Congress of the International Society for Photogrammetry and Remote Sensing, Melbourne 2012.

Reviewer, *ISPRS Journal of Photogrammetry and Remote Sensing*.
Reviewer, *Journal of Spatial Science*.
Reviewer, *Photogrammetric Engineering and Remote Sensing*.
Reviewer, *Photogrammetric Record*.
Reviewer, *Survey Review*.

Previous

Chair and Member of the Victorian State selection committee for Fulbright Scholarships 2006-2010.
Chair, Working Group VI/2, International Society of Photogrammetry and Remote Sensing 2000-2008.
Editor, *TransTasman Surveyor* 1999-2004.
Associate Editor, *Journal of Spatial Science*, 2004
Secretary of Commission V (Close Range Techniques and Machine Vision) of the International Society of Photogrammetry and Remote Sensing 1992-1996.
Australian Delegate to Commission V of the International Society of Photogrammetry and Remote Sensing 1985-1988.
Co-secretary of Commission 6 of the International Federation of Surveyors (FIG) 1992-1994.
Australian Delegate to Commission 6 of the International Federation of Surveyors (FIG).
Chairman, Australian Photogrammetric and Remote Sensing Society (now inactive).
Director, Remote Sensing and Photogrammetry Association of Australasia Ltd (now inactive).
Institution of Surveyors, Australia Member.
President, Institution of Surveyors, Victoria 2002.
Founding Committee Member, Spatial Sciences Institute, Victoria Division.
Committee Member, Institution of Surveyors, Victoria Division 1988-2003.
Technical Sub-committee, Institution of Surveyors, Victoria Division 1990-1994.
Publications Sub-committee, Institution of Surveyors, Victoria Division 1988-1993.
Committee Member and Vice-President, Victorian Society for Photogrammetry and Remote Sensing, 1984-1993.