CURRICULUM VITAE

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ACADEMIC QUALIFICATIONS:

East China Technical University of Water Resources, China (Sept 1980 - July 1984)	Bachelor of Engineering in Hydraulic Structure Engineering
University of Cambridge (Trinity) (Oct 1986 - Aug 1987)	Master of Philosophy in soil mechanics (Supervisor: Dr Muir-Wood)
Glasgow University, UK (Oct 1987 - March 1991)	Doctor of Philosophy in soil mechanics (Supervisor: Prof Muir-Wood)

PROFESSIONAL EXPERIENCES:

Sydney University (July 1995 to present)	Researcher Associate Department of Civil Engineering
Kiso-Jiban Consultants Co. Ltd. (April 1992 - September 1994)	Senior Researcher Numerical Analysis Section
Nagoya Institute of Technology (June 1991 - March 1992)	Visiting Professor Department of Civil Engineering

Research Interest:

(1) Investigating mechanical properties of geo-materials and identifying key parameters for engineering practice. The study covers reconstituted soils, natural soils with and without fissures, soils with both natural and artificial cementation, rocks, and jointed rock mass.

(2) Numerical analysis of soil and structure interaction. Works include (1) developing finite element analysis code for new constitutive models and new structure element and (2) solving boundary value problems encountered in geotechnical engineering practice.

(3) Constitutive modelling of the behaviour of geo-materials. Two significant accomplishments have been achieved. They are the formulation of a simple predictive model, the Structural Cam Clay Model, and the formulation of a highly accurate model, the Sydney Soil Model.

The Structured Cam Clay Model was formulated by introducing the influence of soil structure into Modified Cam Clay Model. The SCC model has been implemented into the finite element program AFENA to solve practical geotechnical problems, such as simulating the performance of foundations on natural soils and the response of natural soils to cone penetration It has been demonstrated extensively that the model captures well the main features of the behaviour of natural clays for both single element tests and boundary value problems. Recent work also shows that the model has great potential for representing the behaviour of natural sands and natural clays with strong cementation.

The Sydney Soil Model is formulated within the framework of Critical State Soil Mechanics. Starting from the assumption that there exist critical states of deformation for soils and soil properties at such states are intrinsic properties, a reference state behaviour has been theoretically formulated based on the assumption of volumetric hardening. The reference state behaviour of soil is independent of soil structure. Then, the behaviour of a real soil is divided into that of the soil at the reference and that of the soil under the influence of soil structure. The influence of soil structure is introduced by formulating the variation of the additional voids ratio, associated with soil structure, for any general stress or strain path. The proposed model is employed to simulate the behaviour of clays and sands including calcareous clays and sands under both drained and undrained conditions from both conventional triaxial tests and true triaxial tests. The performance of the model is evaluated by comparisons with experimental data. It is shown that the model can provide highly satisfactory simulations for a wide variety of structured soils.

TECHNICAL PEER-REVIEW for the following Journals:

ASCE, Journal of Geotechnical and Geoenvironmental Engineering,
ASCE, International Journal of Geomechanics,
Canadian Geotechnical Journal,
Int. Journal of Numerical and Analytical Methods in Geomechanics.

PUBLICATIONS:

(1) Liu D. F. and Nakai T. (1992), “Softening of sand”, Proc. 27th Conf. JSSMFE, pp523 -526.
(2) Liu D. F. and Nakai T. (1992), “Calculation of softening based on peak strength variation with state parameter”, Proc. 47th Conf. JSCE, pp374 - 375.
(3) Sakajo S., Liu D. F., Yagiura Y., and Hayashi M. (1993), “Simulation of undisturbed sandy soil behaviour with an elastoplastic model”, Proc. 28th Conf. JSSMFE, pp1485-1488.
(4) Sakajo S., Liu D. F., Imoto S., Ogawa S, Nakajima Y., and Komine T., (1994), “Effects of soil characteristics on uplift bearing capacity of inverse T-shape tower foundation in sandy ground”, Proc. 29th Conf. JSSMFE, pp1489-1492.
(5) Muir Wood D., Belkheir K., and Liu D. F., (1994), “Strain softening and state parameter for sand modelling”, Geotechnique vol. 44, No. 2, pp335-339.
(6) Liu M. D., Carter J. P., and Airey D. W. (1996), “A plasticity model for cemented carbonate sediments”, Proc. 2nd Int. Conf. on Soft Soil Engg. Nanjing, Vol. 1, pp243-254.
(7) Liu M. D., Carter J. P. and Airey D. W. (1997), “An elastoplastic stress-strain model for cemented carbonate soils”, accepted for 14th ICSMFE, Hamburg.
(8) Liu M. D. and Carter J. P. (1997), “Prediction of Pore Pressures via Constitutive Models”, Proc. 2nd China-Australia Sym. on Comp. Mech., Sydney, pp153-162.
(9) Liu M. D. and Carter J. P. (1999), “Virgin compression of structured soils”, *Géotechnique*, Vol. 49(1), pp.43-57.
(10) Liu M. D., Carter J. P., Airey D. W. and Xu K. J. (1999), "Explicit stress-stain relationship for cemented carbonate sand", *Proc.* 2nd Int. Sym. on Pre-failure Deformation Characteristics of Geomaterials, pp.475-481.

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(12) Liu M. D. and Carter J. P. (2000), "On the volumetric deformation of reconstituted soils", *Int. J. for Numerical and Analytical Methods in Geomechanics*, Vol. 24(2), pp.101-133.
(13) Liu M. D., Carter J. P., Desai C. S. and Xu K. J. (2000), "Analysis of the compression of structured soils using the disturbed state concept", *Int. J. for Numerical and Analytical Methods in Geomechanics*. Vol. 24, pp.723-735.
(14) Liu M. D. and Carter J. P. (2000), "Modelling the destructuring of soils during virgin compression", *Géotechnique*, Vol. 50(4), pp.479-483.
(15) Liu M. D., Hull T. S., and Cater J. P. (2000), "Compression behaviour of sands", Research Report, No. 801, Sydney University.
(16) Liu M. D. and Carter J. P. (2001) "A general method for defining the number of cycles of repeated loading", *Int. J. for Numerical and Analytical Methods in Geomechanics*, Vol. 25, pp.71-81.
(17) Liu M. D. and Carter J. P. (2001), "A conceptual framework for modelling the mechanical behaviour of structured soils", *Computer Methods and Advances in Geomechanics*, edts Desai, Kundu, Harpalani, Contractor & Kemeny, Vol. 1, pp.347-354.
(18) Liu M. D. & Carter J. P. (2001), "An isotropic strength criterion for geo-materials", *Proc.* 15th Int. Conference Soil Mechanics and Foundation Engineering, Vol. 1, pp.191-194.
(19) Liu M. D. & Carter J. P. (2002), "Structured Cam Clay Model", *Canadian Geotechnical J.*. Vol. 39(6), 1313-1332.
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(24) Liu M. D., H. Chow, Carter J. P. (2003), "A Study of Final Strength of Natural Clays", *Proc*. of International Conference on Slope Engineering, Hong Kong, China, Vol 1.
(25) Liyanapathirana D. S., Liu M. D., Carter J. P., and Airey D. W. (2003), "Predicting the behaviour of foundations on structured soils". *Proc*. of 13th European Conference on Soil Mechanics and Geotechnical Engineering, Prague, Vol. 2, pp.255-260.
(26) Liyanapathirana D. S., Carter J. P., Airey D. W., and Liu M. D. (2003), "Bearing response of shallow foundations on structured soils". *Proc.* of International Conference on Foundations: Innovations, Observations, Design and Practice, Dundee, pp.521-530.
(27) Liu M. D. and Carter J. P. (2004), "Evaluation of the Sydney Soil Model", Advances in Geotechnical Engineering: The Skempton Conference, London, Vol 1, pp.498-509.
(28) Liu M. D. and Carter J. P. (2004), "Application of a new definition for the number of cycles of loading", *Cyclic Behaviour of Soils and Liquefaction Phenomena*, Triantafyllidis (*ed*), pp.57-63.
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(31) Carter J. P. and Liu M. D. (2005), “Review of the Structured Cam Clay model”, invited paper, *Soil constitutive models: evaluation, selection, and calibration,* ASCE, Geotechnical special publication No. 128, pp.99-132.
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(34) Liu M. D. and Carter J. P. (2005), “Effect of sample preparation method on sand behaviour simulated by the Sydney Soil Model”, accepted for the 11th International Conference of IACMAG, Turin, Italy.
(35) Carter J. P. and Liu M. D. (2005), “Some application of the Sydney Soil Model”, accepted for the 16th International Conference of Soil Mechanics and Goetechnical Engineering, Japan.
(36) Liu M. D., J. P. Carter, S. Horpibulsuk, and D. S. Liyanapathirana (2006), “Modelling the behaviour of cemented clay”, submitted to Geo-Shanghai 2006.
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