Lorna J. Gibson
Curriculum Vitae

Education

University of Toronto	B.A.Sc.	1978
University of Cambridge	Ph.D.	1981

Citizenship

Canada, United Kingdom, United States

Principal Fields of Interest

Mechanical behavior of cellular materials; biomechanics; plant mechanics, trabecular bone mechanics, tissue engineering scaffolds, cell mechanics

Employment

Employer	Beginning	Ending
MIT		
Matoula S. Salapatas Professor of Materials Science and Engineering	Jan. 1997	present
Associate Provost	Aug. 2006	June 2008
Chair of the Faculty	July 2005	June 2006
Professor, Materials Science and Engineering	July 1996	Dec. 1996
Professor, Civil Engineering	July 1995	June 1996
Joint appointment with Mechanical Engineering	Jan. 1992	present
Affiliation with Health Sciences & Tech. Program	Feb. 1992	June 2004
Associate Professor (with tenure), Civil Eng.	July 1990	June 1995
Associate Professor (without tenure), Civil Eng.	July 1987	June 1990
Assistant Professor, Civil Engineering	July 1984	June 1987
University of British Columbia		
Assistant Professor, Civil Engineering	July 1982	Aug. 1984
Arctec Canada Ltd.		
Senior Engineer	Nov. 1981	May 1982

Awards Received

Bose Award for Excellence in Teaching	2017
TMS Ellen Swallow Richards Diversity Award	2017
Teaching with Digital Technology Award	2016
MacVicar Faculty Fellow (MIT's top award for undergraduate teaching)	2015
Ruth and Joel Spira Teaching Award for Distinguished Teaching	2013
American Society of Mechanical Engineers, Fellow	2001
Matoula S. Salapatas Professorship, MIT	1997 -
Civil Engineering Department Teaching Award, MIT	1993
National Science Foundation Faculty Award for Women	1991-1996
Gilbert W. Winslow Career Development Chair, MIT	1987-1989
Esther & Harold E. Edgerton Career Development Chair, MIT	1985-1987
Commonwealth Scholarship	1978-1981

Current Organization Membership

American Society of Mechanical Engineers, Fellow

Professional Registration

Registered as Professional Engineer, Province of British Columbia (No. 14089) 1983-84.

Teaching

Undergraduate

Mechanical Behavior of Materials, Mechanics of Materials, Organic and Biomaterials Chemistry Lab, Civil Engineering Materials, Structural Engineering Lab, Structural Analysis, Fluid Mechanics, Service Learning Freshman Advising Seminars (Biomimicking; The Engineering of Trees; The Engineering of Birds)

Graduate

Mechanical Properties of Materials, Cellular Solids, Mechanical Behavior of Construction Materials, Innovative Structural Technologies

MIT Service (Major contributions)

Institute

Associate Provost	2006-2008
Chair, Committee to Review Space Planning	
Chair, Neuroscience Council	
Member, Academic Council	
Member, Deans Group	
Member, Appointments and Promotions Sub-committee	
Member, Building Committee	
Chair of the Faculty	2005-2006
Chair-Elect, MIT Faculty	2004-2005
MIT Presidential Search Committee – Faculty Advisory Committee	2004
Council on Faculty Diversity	2000-2007

School of Engineering

Chair, Committee on Women Faculty in the School of Engineering	1999-2001
Chair, Committee on Women Faculty in the School of Engineering	2011

Department

Search Committee for Head of Dept of Materials Sci & Eng (chair)	2011
Search Committee for Head of Dept of Materials Sci & Eng	2005
Search Committee for Head of Dept of Materials Sci & Eng (chair)	1999
Search Committee for Head of Dept of Civil and Environmental Eng.	2001
Department Council, Materials Science and Engineering	1999-2004
	2011-
Department Council, Civil and Environmental Engineering	1993-1996
Undergraduate Officer, Materials Science and Engineering	2004
Undergraduate Officer, Civil and Environmental Engineering	1993-1996

Patents and Patent Applications

Wallach JC and Gibson LJ "Truss core sandwich panels and methods for making same" US Patent 6,644,535 November 11, 2003.

Bonfield W, Gibson LJ, Harley BA, Lynn AK, Yannas IV and "Biomaterial" WO2006095154 Published Sept 14, 2006. Granted in US, Europe, China, Hong Kong, Israel, Mexico, New Zealand, Singapore, South Africa.

William Bonfield, Lorna J Gibson, Brendan A Harley, Andrew Lynn, Zachary D Wissner-Gross, Ioannis V Yannas, "Layered Scaffolds Produced by Solid-Phase" WO 2008017858 Published: February 14, 2008. Granted in US, Israel, New Zealand.

Technology Transfer

Co-founder, Orthomimetics, Cambridge UK – develops scaffolds for regeneration of orthopaedic tissues. Product is an osteochondral scaffold that has CE Mark approval and has been used in clinical trials in Europe.

PUBLICATIONS

Books

Gibson, L.J. and Ashby, M.F., (1988) Cellular Solids: Structure and Properties, Pergamon Press, Oxford.

Sieradzki, K., Green, D., & Gibson, L., editors. (1991) Mechanical Properties of Porous and Cellular Materials. Materials Research Society Symposium Proceedings Volume 207.

Gibson, L.J. and Ashby, M.F. (1997) Cellular Solids: Structure and Properties, Second Edition, Cambridge University Press, Cambridge, U.K.

Ashby, M.F., Evans, A.G., Fleck, N.A., Gibson, L.J., Hutchinson, J.W., and Wadley, H.N.G. (2000) Metal Foams: A Design Guide, Butterworth Heinemann.

Gibson L.J., Ashby M.F. and Harley B.A. (2010) Cellular Materials in Nature and Medicine. Cambridge University Press.

Book Chapters

Gibson, L. J. (2000), "Chapter 3.31: Properties and Applications of Metal Foams", in Comprehensive Composite Materials; Volume 3: Metal Matrix Composites, Anthony Kelly and Carl Zweben, eds., Pergamon Press, Oxford, U. K., 821-842.

Papers in Refereed Journals

1. Gibson, L.J., Easterling, K.E. and Ashby, M.F. (1981) "The Structure and Mechanics of Cork." Proceedings Royal Society London, A377, 99-117.

2. Gibson, L.J., Ashby, M.F., Schajer, G.S., and Robertson, C.I. (1982), "The Mechanics of Two Dimensional Cellular Materials." Proceedings Royal Society London, A382, 25-42.

3. Gibson, L.J., and Ashby, M.F. (1982) The Mechanics of Three Dimensional Cellular Materials." Proceedings Royal Society London. A382, 43-59.

4. Easterling, K.E., Harrysson, R., Gibson, L.J., and Ashby, M.F. (1982) "On the Mechanics of Balsa and Other Woods." Proceedings Royal Society London A383, 31-41.

5. Maiti, S.K., Ashby, M.F., and Gibson, L.J. (1984) "Fracture Toughness of Brittle Cellular Solids." Scripta Metallurgica, 18, 213-17.

6. Gibson, L.J. (1984), "Optimization of Stiffness in Sandwich Beams with Rigid Foam Cores." Materials Science and Engineering, 67, 125-135.

7. Maiti, S.K., Gibson, L.J. and Ashby, M.F. (1984), "Deformation and Energy Absorption Diagrams for Cellular Solids." Acta Metallurgica 32, 1963-1975.

8. Gibson, L.J. (1985), "The Mechanical Behaviour of Cancellous Bone."J. of Biomechanics, 18, 317-328.

9. Demsetz, L.A. and Gibson, L.J. (1987), "Minimum Weight Design for Stiffness in Sandwich Plates with Rigid Foam Cores." *Materials Science & Engineering* 85, 33-42.

10. Triantafillou, T.C. and Gibson, L.J., (1987) "Failure Mode Maps for Foam-Core Sandwich Beams." *Materials Science and Engineering*, 95, 37-53.

11. Triantafillou, T.C. and Gibson, L.J. (1987), "Minimum Weight Design of Foam-Core Sandwich Panels for a Given Strength" *Materials Science and Engineering*, 95, 55-66.

12. Gibson, L.J., Ashby, M.F. and Easterling, K.E. (1988), "The Structure and Mechanics of the Iris Leaf." J. Materials Science, 23, 3041-3048.

13. Huber, A.T. and Gibson, L.J.(1988), "Anisotropy of Foams" *J. Materials Science*, 23, 3031-3040.

14. Triantafillou, T.C. and Gibson, L.J. (1989) "Debonding in Foam Core Sandwich Panels" *Materials and Structures*, 22, 64-69.

15. Bhat, T.B., Wang, T.G. and Gibson, L.J. (1989) "Microsandwich Honeycomb" Society for the Advancement of Material and Process Engineering 25, 43-46.

16. Gibson, L.J. (1989) "Modelling the Mechanical Behaviour of Cellular Materials" (invited review) *Materials Science and Engineering,* A110, 1-36.

17. Gibson, L.J., Ashby, M.F., Zhang, J. and Triantafillou, T.C.(1989) "Failure Surfaces for Cellular Materials: II Comparison of Models with Experiment" *International Journal of Mechanical Sciences*, 31, 665-678.

18. Triantafillou, T.C., Zhang, J., Shercliff, T.L., Gibson, L.J. and Ashby, M.F. (1989) "Failure Surfaces for Cellular Materials under Multiaxial Loads: I Modelling" *International Journal of Mechanical Sciences*, 31, 635-663.

19. Triantafillou, T.C. and Gibson, L.J. (1990) "Multiaxial Failure Criteria for Brittle Foams" *International Journal of Mechanical Sciences*, 32, 479-496.

20. Huang, J.S. and Gibson, L.J. (1990) "Creep of Sandwich Beams with Polymer Foam Cores" *Journal of Materials in Civil Engineering*, 2, 171-182.

21. Triantafillou, T.C. and Gibson, L.J. (1990) "Constitutive Modelling of Elastic-Plastic Open-Cell Foams" *Engineering Mechanics*, 116, 2772-2778.

22. Huang, J.S. and Gibson, L.J. (1991) "Creep of Polymer Foams" *Journal of Materials Science,* 26, 637-647.

23. Huang, J.S. and Gibson, L.J. (1991) "Fracture Toughness of Brittle Honeycombs" *Acta Metallurgica et Materialia* 39, 1617-1626.

24. Huang, J.S. and Gibson L.J. (1991) "Fracture Toughness of Brittle Foams" *Acta Metallurgica et Materialia* 39, 1627-1636.

25. Tonyan, T. D. and Gibson, L. J. (1992). "Structure and Mechanics of Cement Foams." *Journal of Materials Science*, 27, 6371-6378.

26. Tonyan, T. D. and Gibson, L. J. (1992). "Strengthening of Cement Foams." *J. of Mats. Science*. 28, 6379-6386.

27. Huang, J. S. and Gibson, L. J. (1992). "Elastic Moduli of a Composite of Hollow Spheres in a Matrix." *Journal of the Mechanics and Physics of Solids*, 41, 55-75.

28. Keaveny, T.M., Borchers, R.E., Gibson, L.J. and Hayes, W.C. (1993) "Technical Note: Theoretical Analysis of the Experimental Artifact in Compression Testing of Trabecular Bone", *J. Biomech.*, 26, 599-607

29. Huang, J.S. and Gibson, L.J. (1993) "Optimum Cell Size and Density of Brittle Foams. *J. Mat. Sci. Lett.* 12, 602-604.

30. Michel, M. C., Guo, X. E., Gibson, L. J. McMahon, T. A. and Hayes, W. C. (1993) "Compressive Fatigue Behavior of Bovine Trabecular Bone," *J. Biomech*., 26, 453-463.

31. Loree, H.M., Grodzinsky, A.J., Park, S.Y., Gibson, L.J., and Lee, R.T. (1993) "Static Circumferential Tangential Modulus of Human Atherosclerotic Tissue", *J. Biomech.*, 27, 195-204.

32. Huang, J.S. and Gibson, L.J. (1993) "Materials and Cross-Sectional Shapes for Bending Stiffness", *Materials Science and Engineering*, A163, 51-59.

33. Keaveny, T.M., Borchers, R.E., Gibson, L.J. and Hayes, W.C. (1993) "Trabecular Bone Modulus and Strength Can Depend on Specimen Geometry. *J. Biomech.*, 26, 991-1000.

34. Bowman, S.M., Keaveny, T.M., Hayes, W.C., Gibson, L.J. and McMahon, T.A. (1994) "Compressive Creep of Bovine Trabecular Bone", *J. Biomech.*, 27, 301-310.

35. Guo, X. E., McMahon, T.A., Keaveny, T.M., Hayes, W.C., and Gibson, L.J. (1994) "Finite Element Modelling of Damage Accumulation in Trabecular Bone under Cyclic Loading." *J. Biomech.*, 27, 145-155.

36. Loree, H.M., Tobias, B.J., Gibson, L.J., Kamm, R.D., Small, D.M. and Lee, R.T. (1994) "Mechanical Properties of Model Atherosclerotic Lesion Lipid Pools", *Arteriosclerosis and Thrombosis*, 14, 230-34.

37. Karam, G.N. and Gibson, L.J. (1994) "Evaluation of Commercial Wood-cement Composites for Sandwich Panels Facing", ASCE, *J. of Materials in Civil Engineering*, 6, 100-116.

38. Karam, G.N. and Gibson, L.J. (1994) "Biomimicking of Animal Quills and Plant Stems: Natural Cylindrical Shells with Foam Cores" *Materials Science and Engineering C: Biomimetic Materials, Sensors and Systems*, C2, 113 - 132

39. Wegner, L.W. and Gibson, L.J. (1995) "Microstructural Design of Cellular Materials: Microsandwich Foams" *Acta Metallurgica et Materialia*, 43, 1651-67.

40. Karam, G.N. and Gibson, L.J. (1995) "Elastic Buckling of Cylindrical Shells with Elastic Cores I: Analysis" *Int. J. Solids and Structures*, 32, 1259-83.

41. Karam, G.N. and Gibson, L.J. (1995) "Elastic Buckling of Cylindrical Shells with Elastic Cores II: Experiments" *Int. J. Solids and Structures*, 32, 1285-1306.

42. Huang, J.S. and Gibson, L.J. (1995) "Microstructural Design of Cellular Materials: Honeycomb Beams and Plates" *Acta Metallurgica et Materialia*, 43, 1643-50.

43. Borchers, R.E., Gibson, L.J., Burchardt, H., and Hayes, W.C. (1995) "Effects of Selected Thermal Variables on the Mechanical Properties of Trabecular Bone", *Biomaterials*, 16, 545-51.

44. Chen, C.P. and Gibson, L.J. (1995) "Fracture Toughness Performance Indices for Microsandwich foams", *J. Mat. Sci. Letters*, 14, 665-67.

45. Ashby, M.F., Gibson, L.J., Wegst, U., Olive, R. (1995) "The Mechanical Properties of Natural Materials I: Material Property Charts", Proceedings of the Royal Society, A450, 123-140.

46. Gibson, L.J., Ashby, M.F., Karam, G.N., Wegst, U.G.K., Shercliff, H.R. (1995) "The Mechanical Properties Of Natural Materials II: Microstructures For Mechanical Efficiency", Proceedings of the Royal Society, A450, 141-165

47. Silva, M.J, Hayes, W.C. and Gibson, L.J., (1995), "The Effects of Non Periodic Microstructure on the Elastic Properties of Two-Dimensional Honeycombs" *International Journal of Mechanical Science*, 37, 1161-1177.

48. Simone, A.E. and Gibson, L.J., (1996), "The Tensile Strength of Porous Copper Made by the GASAR Process" *Acta Metal. et Materialia*, 44, 1437-1447.

49. Courtney, A.C., W.C. Hayes, and L.J. Gibson. (1996) "Age-Related Differences in Post-Yield Damage in Human Cortical Bone: Experiment and Model", *J. Biomech*, 29, 1463 - 1471.

50. Bowman, S. M., Zeind, J., Gibson, L.J., Hayes, W.C. and McMahon, T.A. (1996) "Technical Note: The Tensile Behaviour of Demineralized Bovine Cortical Bone" *J. Biomech*, 1497 - 1501.

51. Simone, A.E. and Gibson, L.J. (1997) "The Compressive Behavior of Porous Copper Made by the GASAR Process" *J. Mat. Sci.*, 32, 451 – 457.

52. Simone, A.E. and Gibson, L.J. (1997) "Efficient Structural Components Using Porous Metals", *Materials Science & Engineering*, 55 - 62.

53. Silva, M.J. and Gibson, L.J. (1997) "Modeling the mechanical behavior of vertebral trabecular bone: effects of age-related changes in microstructure", Bone, 21, No. 2, 191-199.

54. Silva, M.J. and Gibson, L.J. (1997) "The Effects of Non-Periodic Microstructure and Defects on the Compressive Strength of Two-Dimensional Cellular Solids", Int'l. J. Mech. Sci., 39, 549-563.

55. Ford, C. M. and Gibson, L. J. (1998) "Uniaxial Strength Asymmetry in Cellular Materials: An Analytical Model", *Int'l. J. Mech. Sci.*, 40, 6, 521-531.

56. Simone, A. E. and Gibson, L. J. (1998) "Aluminum Foams Produced by Liquid State Processes", *Acta Materialia*, 46, 9, 3109-3123.

57. Simone, A. E. and Gibson, L. J. (1998) "The Effects of Solid Distribution on the Stiffness of Metallic Foams", *Acta Materialia*, 46, 6, 2139-2150.

58. Torquato, S., Gibiansky, L. V., Silva, M. J., and Gibson, L. J. (1998) "Effective Mechanical and Transport Properties of Cellular Solids", *Int'l J. Mech. Sci.*, 40, 1, 71-82.

59. Simone, A. E. and Gibson, L. J. (1998) "The Effects of Cell Face Curvature and Corrugations on the Stiffness and Strength of Metallic Foams", *Acta Materialia*, 46, 3929-3935.

60. Bowman, S. M., Guo, X. E., Cheng, D. W., Keaveny, T. M., Gibson, L. J, Hayes, W. C, and McMahon, T. A. (1998) "Creep Contributes to Fatigue of Bovine Trabecular Bone", *J. Biomech. Eng.*, 120, 647-654.

61. Guo, X. E. and Gibson, L. J., (1999) "Behavior of Intact and Damaged Honeycombs: A finite element study", *Int. J. Mech. Sci.*, 41, 85-105.

62. Bowman, S. M., Gibson, L. J., Hayes, W. C., and McMahon, T. A. (1999) "Results from Demineralized Creep Tests Suggest that Collagen Is Responsible for the Creep Behavior of Bone", *J. Biomech. Eng.*, 121, 2, 253-258.

63. Andrews, E. W., Huang, J.-S., and Gibson, L. J., (1999) "Creep Behavior of a Closed-Cell Aluminum Foam", *Acta Materialia*, 47, 2927-2935.

64. Andrews, E. W., Gibson, L. J., and Ashby, M. F., (1999) "The Creep of Cellular Solids", *Acta Materialia*, 47, 2853-2863.

65. Andrews, E. W., Sanders, W., and Gibson, L. J., (1999) "Compressive and Tensile Behaviour of Aluminum Foams", *Materials Science and Engineering*, A270, 113-124.

66. Gioux, G., McCormack, T. M., and Gibson, L. J., (2000) "Failure of Aluminum Foams Under Multiaxial Loads", *Int. J. Mech. Sci.*, 42, 6, 1097-1117.

67. Wegner, L. D. and Gibson, L. J., (2000) "The Mechanical Behaviour of Interpenetrating Phase Composites - I: Modelling", *Int. J. Mech. Sci.*, 42, 5, 925-942.

68. Wegner, L. D. and Gibson, L. J., (2000) "The Mechanical Behaviour of Interpenetrating Phase Composites - II: A Case Study of a Three-Dimensionally Printed Material", *Int. J. Mech. Sci.*, 42, 5, 943-964.

69. Schaffner, G., Guo, X.–D. E., Silva, M. J., and Gibson, L. J., (2000) "Modelling Fatigue Damage Accumulation in Two-Dimensional Voronoi Honeycombs", *Int. J Mech Sci.*, 42, 2, 645-656.

70. Gibson, L. J. (2000) "Mechanical Behavior of Metallic Foams", *Annual Review of Materials Science*, 30, 191-227.

71. Lee, T. C., T. L. Arthur, L. J. Gibson, and W. C. Hayes, (2000) "Sequential Labelling of Microdamage in Bone Using Chelating Agents", *Journal of Orthopaedic Research*, 18, 322-325.

72. Vajjhala, S., Kraynik, A.M., and Gibson, L.J., (2000) "A Cellular Solid Model for Modulus Reduction due to Resorption of Trabeculae in Bone", *J. of Biomechanical Engineering*, 122, 511-515.

73. Onck, P. R., Andrews, E. W., and Gibson, L. J., (2001) "Size Effects in Ductile Cellular Solids Part I: Modeling", *Int. J Mech Sci.*, 43, 681-699.

74. Andrews, E. W., Gioux, G., Onck, P. R., and Gibson, L. J., (2001) "Size Effects in Ductile Cellular Solids Part II: Experimental Results", *Int. Journal Mech Sci.*, 43, 701-713.

75. Wegner, L.D., Gibson, L.J., (2001) "The Mechanical Behaviour of Interpenetrating Phase Composites - III Resin Impregnated Porous Stainless Steel", *International Journal of Mechanical Science*, 43, 1061-72.

76. McCormack T. M., Miller R., Kelser G., Gibson L. J. (2001) "Sandwich beams with metallic foam cores.", *Int J Solids and Structures*, 38, 4901-20.

77. Freyman T. M., Yannas I. V., Gibson L. J., (2001) "Cellular materials as porous scaffolds for tissue engineering." *Progress in Materials Science,* (Ashby symposium), 46, 273-82.

78. Wallach, J. C. Gibson, L. J. (2001) "Mechanical Properties of Three-Dimensional Truss Material.", *Int. J. Solids and Structures*, 38, 7181-7196.

79. Andrews, E. W., Gibson, L. J. (2001) "The Role of Cellular Structure in Creep of Two-Dimensional Cellular Solids." *Mat. Sci. and Eng.* A303, 120-26.

80. Andrews, E. W., Gibson, L. J. (2001) "The Influence of Crack-Like Defects on the Tensile Strength of an Open-Cell Aluminum Foam." *Scripta Materialia*, 44, 1005-1010.

81. Freyman, T. M., Yannas, I. V., Yokoo, R. and Gibson, L. J. (2001) "Fibroblast Contraction of a Collagen-GAG Matrix." *Biomaterials*, 22, 2883-2891.

82. Wallach, J.C., Gibson, L.J. (2001) "Defect Sensitivity of a 3D Truss Material" *Scripta Mat.*, 45, 639-44.

83. Zaleskas, J.M., Kinner, B., Freyman, T.M., Yannas, I.V., Gibson, L.J. and Spector, M. (2001) "Growth Factor Regulation of Smooth Muscle Actin Expression and Contraction of Human Articular Chondrocytes and Meniscal Cells in a Collagen-GAG Matrix." *Exp. Cell Res.*, 270, 21-31.

84. Wegner, L.D., Gibson, L.J. (2001) "The Fracture Toughness Behaviour of Interpenetrating Phase Composites." *Int. J. Mech. Sci.*, 43, 1771-1779.

85. Andrews, E. W., Gibson, L.J. (2001) "The Influence of Cracks, Notches and Holes on the Tensile Strength of Cellular Solids." *Acta Materialia*, 49, 2975-2979.

86. Arthur Moore, T.L., Gibson, L.J. (2001) "Modeling Modulus Reduction in Bovine Trabecular Bone Damaged in Compression" *J. Biomech. Eng.*, 123, 613-622.

87. Freyman, T.M., Yannas, I.V., Pek, Y-S., Yokoo, R. and Gibson, L.J. (2001) "Micromechanics of Fibroblast Contration of a Collagen-GAG Matrix." *Exp. Cell Research*, 269, 140-153.

88. Kesler, O., Gibson, L.J. (2002) "Size effects in metallic foam core sandwich beams." *Mat. Sci. and Eng.*, A326, 228-34.

89. Arthur Moore, T.L. and Gibson, L.J. (2002) "Microdamage accumulation in bovine trabecular bone in uniaxial compression." *J. Biomech. Eng.*, 124, 63-71.

90. Freyman, T.M., Yannas, I.V., Yokoo, R. and Gibson, L.J. (2002) "Fibroblast contractile force is independent of the stiffness which resists contraction." *Exp. Cell. Res.*, 272, 153-162.

91. Huang. J.S. and Gibson, L.J. (2002) "Creep of open-cell Voronoi foams," *Mat. Science and Eng.*, A339, 220-226.

92. Andrews, E.W. and Gibson, L. J. (2002) "On notch-strengthening and crack tip deformation in cellular metals," *Materials Letters*, 57, 532-536.

93. Kesler, O., Crews, L.K., and Gibson, L.J. (2002) "Creep of Sandwich Beams with Metallic Foam Cores," *Mat. Science and Eng.*, A341, 264-72.

94. Makiyama, A.M., Vajjhala, S. and Gibson, L.J. (2002) "Analysis of Crack Growth in a 3D Voronoi Structure: A Model for Fatigue in Low Density Trabecular Bone," *Journal of Biomechanical Engineering*, 124, 512-20.

95. Sanders, W.S. and Gibson, L.J. (2003) "Mechanics of hollow sphere foams," *Mat. Science and Eng.*, A347, 70-85.

96. Sanders, W.S. and Gibson, L.J. (2003) "Mechanics of BCC and FCC hollow sphere foams," *Mat. Science and Eng.*, A352, 150-61.

97. Moore, T.L.A. and Gibson, L.J. (2003) "Fatigue of bovine trabecular bone," *J. Biomech. Eng.*, 125, 761-768.

98. Moore, T.L.A. and Gibson, L.J. (2003) "Fatigue microdamage in bovine trabecular bone," *J. Biomech. Eng.*, 125, 769-776.

99. Pek, Y.S., Spector, M., Yannas, I.V. and Gibson, L.J. (2004) "Degradation of a collagen-chondroitin-6sulfate matrix by collagenase and chondroitinase," *Biomaterials*, 25, 473-82.

100. O'Brien, F.J., Harley, B.A., Yannas, I.V. and Gibson, L.J. (2004) "Influence of freezing rate on uniformity of pore structure in freeze-dried collagen-GAG scaffolds" *Biomaterials*, 25, 1077-1086.

101. Zaleskas, J.M., Kinner, B., Freyman, T.M., Yannas, I.V., Gibson, L.J. and Spector, M. (2004) "Contractile forces generated by articular chondrocytes in collagen-glycosaminoglycan matrices," *Biomaterials*, 25, 1299-1308.

102. Moore, T.L.A., O'Brien, F.J. and Gibson, L.J. (2004) "Creep does not contribute to the fatigue of bovine trabecular bone" *J. Biomech. Eng.* 126, 321-329.

103. Ganguly, P., Moore, T.L.A. and Gibson, L.J. (2004) "Macroscropic trends in fatigue processes in bovine trabecular bone" *J. Biomech. Eng.*, 126, 330-339.

104. Vickers, S.M., Johnson, L.L., Zou, L., Yannas I.V., Gibson, L.J. and Spector, M. (2004) "Expression of α-smooth muscle actin in and contraction of cells derived from synovium,"Tissue Engineering 10, 1214-1223.

105. O'Brien, F.J., Harley, B.A., Yannas, I.V. and Gibson, L.J. (2005) "The effect of pore size on cell adhesion in collagen-GAG scaffolds," *Biomaterials*, 26, 433-441.

106. Gibson, L.J., (2005) "Biomechanics of cellular solids," *Invited Review*, *J. Biomech.*, 38, 377-399.

107. Gibson, L. J.(2006) "Woodpecker pecking: how woodpeckers avoid brain injury" J. Zoology, 207, 462-465.

108. O'Brien FJ, Harley BA, Waller MA, Yannas IV, Gibson LJ and Prendergast PJ (2007) "The effect of pore size on permeability and cell attachment in collagen scaffolds for tissue engineering" Tech. Health Care, 15, 3-17.

109. Dawson MA and Gibson LJ (2007) "Optimization of Cylindrical Shells with Compliant Cores" Int. J. Solids Structures, 44, 1145-60.

110. Dawson MA Germaine JT and Gibson LJ (2007) "Permeability of open-cell foams under compressive strain" Int. J. Solids and Structures, 44, 5133-5145.

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114. Kanungo, B, Silva E, Van Vliet KJ and Gibson LJ (2008) Characterization of a mineralized collagen GAG scaffold for bone regeneration. Acta Biomaterialia, 4, 490-503.

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