References

- H. Heidt, J. Puig-Suari, A. S. Moore, S. Nakasuka, and R. J. Twiggs, "CubeSat: A new Generation of Picosatellite for Education and Industry Low-Cost Space Experimentation," in *14th AIAA/USU Conference on Small Satellites*, 2000.
- [2] P. Mallol and G. Tibert, "Deployment Modelling and Experimental Testing of a Bi-stable Composite Boom for Small Satellites," in 54th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials, 2013.
- [3] A. J. Cook and S. J. I. Walker, "Experimental research on tape spring supported space inflatable structures," *Acta Astronautica*, vol. 118, pp. 316–328, Jan. 2016.
- [4] S. T. West, C. White, C. Celestino, S. Philpott, and M. Pankow, "Design and Testing of Deployable Carbon Fiber Booms for CubeSat Non-Gossamer Applications," in 56th AIAA/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, 2015.
- [5] B. Osborne and C. Welch, "Short duration reduced gravity drop tower design and development," *JBIS - Journal of the British Interplanetary Society*, vol. 65, no. 2–3, pp. 71–76, 2012.
- [6] T. Y. Liu, Q. P. Wu, B. Q. Sun, and F. T. Han, "Microgravity Level Measurement of the Beijing Drop Tower Using a Sensitive Accelerometer," *Scientific Reports*, vol. 6, pp. 1–9, 2016.
- [7] C. R. Calladine, "The theory of thin shell structures 1888–1988," in Proceedings of the Institution of Mechanical Engineers, Part A: Journal of Power and Energy, vol. 202, no. 3, pp. 141–149, 1988.
- [8] R. M. Jones, *Mechanics of Composite Materials*, 2nd edition. New York: Burnner-Routledge: Taylor and Fancis Group, 1998.
- [9] M.I. Daniel and O. Ishai., *Engineering Mechanics of Composite Materials*, 2nd edition. Oxford University Press, 2005.

- [10] R. F. Gibson, *Principles of Composite Material Mechanics*, 2nd edition, 2007.
- [11] M. Sakovsky, "Design and Characterization of Dual-Matrix Composite Deployable Space Structures," PhD thesis, California Institute of Technology, 2018.
- [12] O. Soykasap, "Micromechanical Models for Bending Behavior of Woven Composites," *Journal of Spacecraft and Rockets*, vol. 43, no. 5, pp. 1093–1100, 2006.
- [13] L. S. Datashvili, H. Baier, and L. Schmidt, "Multi-scale Analysis of Structures Made of Triaxially Woven Fabric Composites with Stiff and Flexible Matrix Materials," in 52nd AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics and Materials Conference, 2011.
- [14] W. G. Jiang, "Implementation of domain superposition technique for the nonlinear analysis of composite materials," *Journal of Composite Materials*, vol. 47, no. 2, pp. 243–249, 2013.
- [15] W. G. Jiang, S. R. Hallett, and M.R. Wisnom, "Development of Domain Superposition Technique for the Modelling of Woven Fabric Composites," *Mechanical Response of Composites. Computational Methods in Applied Sciences*, vol. 10, 2008.
- [16] A. Kueh and S. Pellegrino, "ABD Matrix of Single-Ply Triaxial Weave Fabric Composites," in 48th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, 2007.
- [17] R. L. Karkkainen and B. V. Sankar, "A direct micromechanics method for analysis of failure initiation of plain weave textile composites," *Composites Science and Technology*, vol. 66, no. 1, pp. 137–150, 2006.
- [18] J. Reveles, M. Lawton, V. Fraux, and V. Gurusamy, "The Development of a Low Mass Extendible Composite Boom for Small Satellite Applications," in 29th Annual AIAA/USU Conference on Small Satellites, 2015.
- [19] D. Lichodziejewski, B. Derbès, K. Slade, and T. Mann, "Vacuum deployment and testing of a 4-quadrant scalable inflatable rigidizable solar sail system," in

46th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics & Materials Conference, Austin, Texas, 2005.

- [20] H. Mao, G. P. Luigi, G. Michele, I. Nickolay, and T. Gunnar, "Deployment of Bistable Self-Deployable Tape Spring Booms Using a Gravity Offloading System," *Journal of Aerospace Engineering*, vol. 30, no. 4, p. 4017007, 2017.
- [21] S. Seriani and P. Gallina, "A Storable Tubular Extendible Member (STEM) parallel robot: Modelization and evaluation," *Mechanism and Machine Theory*, vol. 90, pp. 95–107, 2015.
- [22] J. C. H. Yee and S. Pellegrino, "Composite Tube Hinges," *Journal of Aerospace Engineering*, vol. 18, no. 4, pp. 224–231, 2005.
- [23] D. Campbell, M. S. Lake and M. R. Scherbarth, "Elastic memory composite material: An enabling technology for future furable space structures," in 46th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, Austin, TX., 2005.
- [24] R. Marissen and H. R. Brouwer, "The significance of fibre microbuckling for the flexural strength of a composite," *Composites Science and Technology*, vol. 59, no. 3, pp. 327–330, 1999.
- [25] T. W. Murphey, T. Meink and M. M. Mikulas, "Some Micromechanics Considerations Of The Folding Of Rigidizable Composite Materials," in 42nd AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics and Materials Conference, 2001.
- [26] C. Karl, "Multifunctional dual-matrix composites for thin-walled deployable space structures," Master's thesis, Technische Universität München, 2015.
- [27] H. M. Y. C. Mallikarachchi and S. Pellegrino, "Quasi-Static Folding and Deployment of Ultrathin Composite Tape-Spring Hinges," *Journal of Spacecraft and Rockets*, vol. 48, no. 1, pp. 187–198, 2011.
- [28] H. M. Y. C. Mallikarachchi and S. Pellegrino, "Design of Ultrathin Composite Self-Deployable Booms," *Journal of Spacecraft and Rockets*, vol. 51, no. 6, pp. 1811–1821, 2014.

- [29] H. M. Y. C. Mallikarachchi and S. Pellegrino, "Deployment Dynamics of Composite Booms with Integral Slotted Hinges," in AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics and Materials Conference, 2014.
- [30] P. A. Warren, B. J. Dobson, J. D. Hinkle, and M. Silver, "Experimental Characterization of Lightweight Strain Energy Deployment Hinges," in 46th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics & Materials Conference, 2005.
- [31] H. Yang, Z. Deng, R. Liu, Y. Wang, and H. Guo, "Optimizing the qusai-static folding and deploying of thin-walled tube flexure hinges with double slots," *Chinese Journal of Mechanical Engineering*, vol. 27, no. 2, pp. 279–286, 2014.
- [32] A. Stabile and S. Laurenzi, "Coiling dynamic analysis of thin-walled composite deployable boom," *Composite Structures*, vol. 113, no. 1, pp. 429–436, 2014.
- [33] C. Leclerc, L. Wilson, M. A. Bessa, and S. Pellegrino, "Characterization of ultra-thin composite triangular rollable and collapsible booms," in 4th AIAA Spacecraft Structures Conference, 2017.
- [34] J. Block, M. Straubel, and M. Wiedemann, "Ultralight deployable booms for solar sails and other large gossamer structures in space," *Acta Astronautica*, vol. 68, no. 7–8, pp. 984–992, 2011.
- [35] D. Barbera and S. Laurenzi, "Nonlinear buckling and folding analysis of a storable tubular ultrathin boom for nanosatellites," *Composite Structures*, vol. 132, pp. 226–238, 2015.
- [36] Y. Hu, W. Chen, J. Gao, J. Hu, G. Fang, and F. Peng, "A study of flattening process of deployable composite thin-walled lenticular tubes under compression and tension," *Composite Structures*, vol. 168, pp. 164–177, 2017.
- [37] K. A. Seffen, Z. You, and S. Pellegrino, "Folding and deployment of curved tape springs," *International Journal of Mechanical Sciences*, vol. 42, no. 10, pp. 2055–2073, 2000.
- [38] K. A. Seffen and S. Pellegrino, "Deployment dynamics of tape springs," in

Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences, 1999.

- [39] W. Szyszkowski, K. Fielden, and D. W. Johnson, "Self-locking satellite boom with flexure-mode joints," *Applied Mechanics Reviews*, vol. 50, pp. 225–231, 1997.
- [40] M. Sakovsky, S. Pellegrino, and H. M. Y. C. Mallikarachchi, "Folding and Deployment of Closed Cross-Section Dual-Matrix Composite Booms," in 3rd AIAA Spacecraft Structures Conference, 2016.
- [41] K. Ubamanyu and H. M. Y. C. Mallikarachchi, "Simulation of Dual-Matrix Composite Boom," in *Proceedings of Annual Session of Society of Structural Engineers*, 2016.
- [42] B. M. Ted Belytschko, Wing Kam Liu, *Nonlinear Finite Elements for Continua and Structures*, 1st edition. 2000.
- [43] Abaqus, "Analysis User's Guide," Dassault Systemes Simulia Corp., Providence, Rhode Island, 2014.
- [44] S. Gere, J. and Timoshenko, *Mechanics of Materials*, 4th edition. 1997.
- [45] H. M. Y. C. Mallikarachchi, "Thin-walled composite deployable booms with tape-spring hinges," PhD thesis, University of Cambridge, 2011.
- [46] MATLAB and Statistics Toolbox, "User's Guide (r2014b)." Mathworks Inc., 2014.