



Professor Davide Bigoni



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Selected Publications:

Books:

D. Bigoni, *Nonlinear Solid Mechanics Bifurcation Theory and Material Instability*. Cambridge University Press, 2012, ISBN 9781107025417.

D. Bigoni, O. Kirillov *Dynamic Stability and Bifurcation in Nonconservative Mechanics - CISM Lecture Notes No. 586*. Springer, 2019, ISBN 978-3-319-93722-9, doi 10.1007/978-3-319-93722-9.

D. Bigoni, *Extremely Deformable Structures - CISM Lecture Notes No. 562*. Springer, 2015, ISBN 978-3-7091-1876-4, doi 10.1007/978-3-7091-1877-1.

Journal Articles, etc.:

D. Bigoni *Localization of deformation and bifurcation in incremental non-associative elastoplasticity: applications to brittle-cohesive materials*. Ph.D dissertation, University of Bologna (in Italian). 1991

Rizzi, G., Dal Corso, F., Veber, D., Bigoni, D. (2019). Identification of second-gradient elastic materials from planar hexagonal lattices. Part I: Analytical derivation of equivalent constitutive tensors. *International Journal of Solids and Structures*, 176-177, 1-18.

Rizzi, G., Dal Corso, F., Veber, D., Bigoni, D. (2019). Identification of second-gradient elastic materials from planar hexagonal lattices. Part II: Mechanical characteristics and model validation. *International Journal of Solids and Structures*, 176-177, 19-35.

Dal Corso, F., Tallarico, D., Movchan, N., Movchan, A., Bigoni, D. (2019). Nested Bloch waves in elastic structures with configurational forces. *Philosophical Transactions of the Royal Society A*, 377: 2019

Armanini, C., Dal Corso, F., Misseroni, D., Bigoni, D. (2019). Configurational forces and nonlinear structural dynamics. *Journal of the Mechanics and Physics of Solids*, 130, 82-100.

Bordiga, G., Cabras, L., Bigoni, D., Piccolroaz, A. (2018). Free and forced wave propagation in a Rayleigh-beam grid: Flat bands, Dirac cones, and vibration localization vs isotropization. *International Journal of Solids and Structures* In Press.

Giarola, D., Capuani, D., Bigoni, D. (2018). Dynamic interaction of multiple shear bands. *Scientific Reports* 8 16033.

Bigoni, D., Kirillov, O., Misseroni, D., Noselli, G., Tommasini, M. (2018). Flutter and divergence instability in the PflÄger column: Experimental evidence of the Ziegler destabilization paradox. *Journal of the Mechanics and Physics of Solids* 116, 99-116.

Bigoni, D., Bordignon, N., Piccolroaz, A., Stupkiewicz, S. (2018). Bifurcation of elastic solids with sliding interfaces. *Proceedings of the Royal Society A* 474 20170681.

Bigoni, D., Misseroni, D., Tommasini, M., Kirillov, O., Noselli, G. (2018). Detecting singular weak-dissipation limit for flutter onset in reversible systems. *Physical Review E* 97, 023003.

Giarola, D., Capuani, D., Bigoni, D. (2018). The dynamics of a shear band. *Journal of the Mechanics and Physics of Solids*, 112, 472-490

Papathanasiou, T.K., Movchan, A.B., Bigoni, D. (2017). Wave reflection and transmission in multiply stented blood vessels *Proceedings of the Royal Society A*, 473: 1364-5021.

Gourgiotis, P.A., Bigoni, D. (2017). The dynamics of folding instability in a constrained Cosserat medium. *Philosophical Transactions of the Royal Society A*, A 375: 20160159; doi:

Bosi, F., Misseroni, D., Dal Corso, F., Neukirch, S., Bigoni, D. (2016). Asymptotic self-restabilization of a continuous elastic structure. *Physical Review E*, 94 (6), 063005

D. Bigoni, P.A. Gourgiotis (2016). Folding and faulting of an elastic continuum. *Proceedings of the Royal Society A*. 472: 20160018,

P.A. Gourgiotis, D. Bigoni (2016). Stress channelling in extreme couple-stress materials Part I: Strong ellipticity, wave propagation, ellipticity, and discontinuity relations *Journal of the Mechanics and Physics of Solids*. 88, 150-168

P.A. Gourgiotis, D. Bigoni (2016). Stress channelling in extreme couple-stress materials Part II: Localized folding vs faulting of a continuum in single and cross geometries, *Journal of the Mechanics and Physics of Solids*. 88, 169-185

N. Bordignon, A. Piccolroaz, F. Dal Corso, D. Bigoni (2015). Strain localization and shear banding in ductile materials. *Frontiers in Materials*, 2015, 2, 1-13

D. Bigoni, F. Bosi, F. Dal Corso and D. Misseroni, Instability of a penetrating blade. *Journal of the Mechanics and Physics of Solids*, 2014, 64, 411-425.

D. Bigoni, D. Misseroni, G. Noselli and D. Zaccaria Effects of the constraints curvature on structural instability: tensile buckling and multiple bifurcations. *Proceedings of the Royal Society A*, 2012, 468, 2191-2209

D. Bigoni and G. Noselli Experimental evidence of flutter and divergence instabilities induced by dry friction. *Journal of the Mechanics and Physics of Solids*, 2011, 59, 2208-2226.

D. Zaccaria, D. Bigoni, G. Noselli and D. Misseroni Structures buckling under tensile dead load. *Proceedings of the Royal Society A*, 2011, 467, 1686-1700.

· S. Roccabianca, D. Bigoni and M. Gei Long-wavelength bifurcations and multiple neutral axes in elastic multilayers subject to finite bending. *Journal of Mechanics of Materials and Structures*, 2011, 6, 511-527, special issue dedicated to Marie-Louise and Charles Steele.

G. Noselli, F. Dal Corso and D. Bigoni The stress intensity near a stiffener disclosed by photoelasticity. *International Journal of Fracture*, 2010, 166, 91-103.

S. Roccabianca, M. Gei and D. Bigoni Plane strain bifurcations of elastic layered structures subject to finite bending: theory versus experiments. *IMA Journal of Applied Mathematics*, 2010, 75, 525-548 .

S. Colli, M. Gei and D. Bigoni, A boundary element formulation for incremental nonlinear elastic deformation of compressible solids. *CMES-Computer Modeling in Engineering and Sciences*, 2009, 40, 29-62.

D. Bigoni and F. Dal Corso, The unrestrainable growth of a shear band in a prestressed material. *Proceedings of the Royal Society A*, 2008, 464, 2365-2390

D. Bigoni, M. Gei and A.B. Movchan, Dynamics of a prestressed stiff layer on an elastic half space: filtering and band gap characteristics of periodic structural models derived from long-wave asymptotics. *Journal of the Mechanics and Physics of Solids*, 2008, 56, 2494-2520.

D. Bigoni, D. Capuani, P. Bonetti, S. Colli, A novel boundary element approach to time-harmonic dynamics of incremental non-linear elasticity: the role of pre-stress on structural vibrations and dynamic shear banding. *Computer Methods in Applied Mechanics and Engineering*, 2007, 196, 4222-4249.

A. Piccolroaz, D. Bigoni, and J.R. Willis, A dynamical interpretation of flutter instability in a continuous medium. *Journal of the Mechanics and Physics of Solids*, 2006, 54, 2391-2417.

D. Bigoni and D. Capuani, Time-harmonic Green's function and boundary integral formulation for incremental nonlinear elasticity: dynamics of wave patterns and shear bands. *Journal of the Mechanics and Physics of Solids*, 2005, 53(5), 1163-1187.

A. Gajo, D. Bigoni and D. Muir Wood, Multiple shear band development and related instabilities in granular materials. *Journal of the Mechanics and Physics of Solids*, 2004, 52(12), 2683-2724.

M. Gei, D. Bigoni and G. Franceschini, Thermoelastic small-amplitude wave propagation in nonlinear elastic multilayers. *Mathematics and Mechanics of Solids*, 2004, 9, 555-568, special issue dedicated to Prof. R.W. Ogden.

A. Benallal and D. Bigoni, Effects of temperature and thermo-mechanical couplings on material instabilities and strain localization of inelastic materials. *Journal of the Mechanics and Physics of Solids*, 2004, 52(3), 725-753.

M. Gei, D. Bigoni and S. Guicciardi, Failure of silicon nitride under uniaxial compression at high temperature. *Mechanics of Materials*, 2004, 36(4), 335-345.

M. Brun, D. Capuani and D. Bigoni, A boundary element technique for incremental, nonlinear elasticity. Part. I: Formulation. *Computer Methods in Applied Mechanics and Engineering*, 192 (22-24), 2003, 2461-2479.

M. Brun, D. Bigoni and D. Capuani, A boundary element technique for incremental, nonlinear elasticity. Part. II: Bifurcation and shear bands. *Computer Methods in Applied Mechanics and Engineering*, 192 (22-24), 2003, 2481-2499.

D. Bigoni and A.B. Movchan, Statics and dynamics of structural interfaces in elasticity. *International Journal of Solids and Structures*, 2002, 39, 4843-4865.

D. Bigoni and D. Capuani, Green's function for incremental nonlinear elasticity: shear bands and boundary integral formulation. *Journal of the Mechanics and Physics of Solids*, 2002, 50, 471-500.

D. Bigoni and H. Petryk, A note on divergence and flutter instabilities in elastic-plastic materials. *International Journal of Solids and Structures*, 2002, 39, 911-926.

E. Radi, D. Bigoni and B. Loret, Steady crack growth in elastic-plastic fluid-saturated porous media. *International Journal of Plasticity*, 2002, 18, 345-358.

D. Bigoni and M. Gei, Bifurcations of a coated, elastic cylinder. *International Journal of Solids and Structures*, 2001, 38, 5117-5148.

D. Bigoni, B. Loret and E. Radi, Localization of deformation in plane elastic-plastic solids with anisotropic elasticity. *Journal of the Mechanics and Physics of Solids*, 2000, 48, 1441-1466, special issue dedicated to Prof. J.R. Willis.

D. Bigoni and B. Loret, Effects of elastic anisotropy on strain localization and flutter instability in plastic solids. *Journal of the Mechanics and Physics of Solids*, 1999, 47, 1409-1436.

D. Bigoni, M. Ortiz and A. Needleman, Effect of interfacial compliance on bifurcation of a layer bonded to a substrate. *International Journal of Solids and Structures*, 1997, 34 (33/34), 4305-4326.

D. Bigoni, On smooth bifurcations in non-associative elastoplasticity. *Journal of the Mechanics and Physics of Solids*, 1996, 44 (8), 1337-1351.

D. Bigoni, On flutter instability in elastoplastic constitutive models. *International Journal of Solids and Structures*, 1995, 32 (21), 3167-3189.

- D. Bigoni and D. Zaccaria, On the eigenvalues of the acoustic tensor in elastoplasticity . *European Journal of Mechanics, A/Solids*, 1994, 13, 621-638.
- D. Bigoni and D. Zaccaria, Eigenvalues of the elastoplastic constitutive operator. *Zeitschrift fuer Angewandte Mathematik und Mechanik (ZAMM)*, 1994, 74, 355-357.
- D. Bigoni, Strain localization in axially-symmetric compression of brittle cohesive materials. *Engineering Fracture Mechanics*, 1992, 42 (4), 617-627.
- D. Bigoni and D. Zaccaria, Loss of strong-ellipticity in non-associative elastoplasticity. *Journal of the Mechanics and Physics of Solids*, 1992, 40 (6), 1313-1331.
- D. Bigoni and D. Zaccaria, Strong ellipticity of comparison solids in elastoplasticity with volumetric non-associativity. *International Journal of Solids and Structures*, 1992, 29 (17), 2123-2136.
- D. Bigoni and T. Hueckel, Uniqueness and localization I. Associative and non-associative elastoplasticity. *International Journal of Solids and Structures*, 1991, 28 (2), 197-213.
- D. Bigoni and T. Hueckel, Uniqueness and localization II. Coupled elastoplasticity. *International Journal of Solids and Structures*, 1991, 28 (2), 215-224.
- D. Bigoni and T. Hueckel, A note on strain localization for a class of non-associative plasticity rules. *Ingenieur-Archiv*, 1990, 60, 491-499.
- D. Bigoni and T. Hueckel, On uniqueness and strain localization in plane strain and plane stress elastoplasticity. *Mechanics Research Communications*, 1990, 17 (1), 15-23, and 17 (3), 189.
- D. Bigoni, F. Bosi, D. Misseroni, F. Dal Corso, and G. Noselli New phenomena in nonlinear elastic structures: from tensile buckling to configurational forces. In *CISM Lecture Notes No. 562 "Extremely Deformable Structures"* (Ch. 2), edited by: D. Bigoni, Springer, 2015 ISBN 978-3-7091-1876-4, doi 10.1007/978-3-7091-1877-1.
- D. Bigoni, D. Misseroni, G. Noselli, D. Zaccaria Surprising instabilities of simple elastic structures. In *Nonlinear Physical Systems - Spectral Analysis, Stability and Bifurcations*, Kirillov, N. and Pelinovsky, D.E. Eds., Wiley, pp. 1-14, 2014; ISBN: 978-1-84821-420-0.
- D. Bigoni, Material instabilities in elastic and plastic solids: the perturbative approach. In *Mechanics down under*, Denier, J.P. and Finn, M.D. Eds., Proc. of the 22th Int. Congress of Theoretical and Applied Mechanics (Adelaide, Australia, 24-29 August 2008) Springer Science, pp. 1-14, 2013; ISBN: 978-94-007-1, DOI 10.1007/978-94-007-5968-8.
- D. Bigoni, M. Gei and S. Roccabianca (2013) Bifurcation of elastic multilayers. In *Mathematical Methods and Models in Composites*. Edited by: V. Mantic, Imperial College Press, ISBN: 978-1-84816-784-1.
- M. Brun, D. Bigoni and D. Capuani, Boundary elements and shear bands in incremental elasticity. In *IUTAM Symposium on Asymptotics, Singularities and Homogenisation in Problems of Mechanics*, A.B. Movchan, Ed., Kluwer, 2003, 317-327.
- A. Gajo, D. Bigoni and D. Muir-Wood, Stress induced elastic anisotropy and strain localization in sand. In *Bifurcation and Localization Theory in Geomechanics*, H.B. Muehlhaus, A. Dyskin and E. Pasternak, Eds., Swets & Zeitlinger, Lisse (ISBN 90 265 1823 4), 2001.
- D. Bigoni, Bifurcation and instability of nonassociative elastoplastic solids. In *CISM Lecture Notes No. 414 "Material Instabilities in Elastic and Plastic Solids"*, H. Petryk, Ed. Springer-Verlag, WienNew York, 2000.
- D. Bigoni and J.R. Willis, A dynamical interpretation of flutter instability. In *Localisation and Bifurcation Theory for Soils and Rock*, R. Chambon, J. Desrues and I. Vardoulakis, Eds., A.A. Balkema, Rotterdam, 1994