



Professor Pasquale Ciarletta

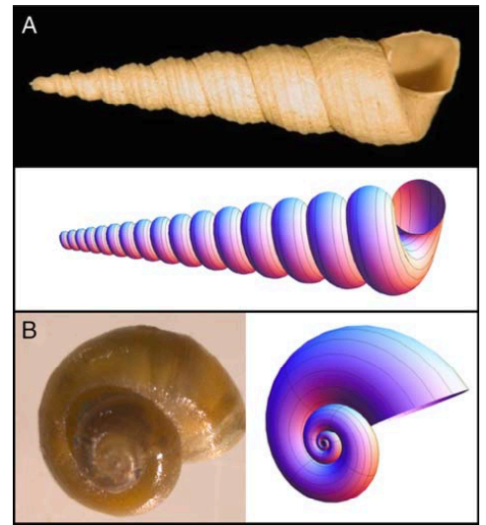
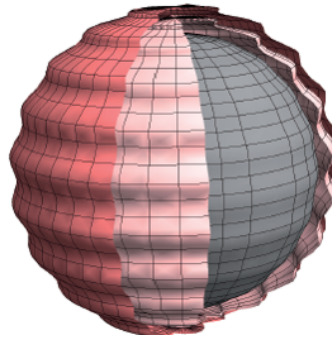


Figure 2. Morphologic comparison of two seashells and their simulated shapes: (A) *Turritella communis* and (B) *Valvata sincera*.

The middle image above is from: Ciarletta P. Buckling Instability in Growing Tumor Spheroids. Physical review letters 110, 158102 (2013).

The right-most image above is from: P. Ciarletta, L. Preziosi and G.A. Maugin, “Thermo-mechanics of growth and mass transfer: Morphogenesis of seashells”, Computer Methods in Biomechanics and Biomedical Engineering, Vol. 15, No. S1, pp 110-112, September 2012

See:

<https://www.researchgate.net/scientific-contributions/15280039-Pasquale-Ciarletta>

<http://www1.mate.polimi.it/~ciarletta/>

<https://scholar.google.com/citations?user=ZgFC1fkAAAAJ&hl=fr>

Mathematical Physics, Department of Mathematics, Politecnico di Milano, Italy

Formerly:

French National Centre for Scientific Research (CNRS)

Research Interests:

Pattern formation in free boundary problems; Shape instabilities in soft matter; Mathematical modeling of biological growth and adaptation; Mechanobiology and morphogenesis in living matter; Multiscale modeling of cancer invasion

Selected Publications:

Julien Dervaux, Pasquale Ciarletta and Martine Ben Amar, “Morphogenesis of thin hyperelastic plates: A constitutive theory of biological growth in the Foppl-von Karman limit”, Journal of the Mechanics and Physics of Solids, Vol. 57, No. 3, pp 458-471, March 2009

Martine Ben Amar and Pasquale Ciarletta, “Swelling instability of surface-attached gels as a model for tissue growth under geometric constraints”, Journal of the Mechanics and physics of Solids, Vol. 58, No. 7, pp 935-954, July 2010

M. Ben Amar, C. Chatelain and P. Ciarletta, “Contour instabilities in early tumor growth models”, Physical Review Letters, Vol. 106, Article ID 148101, 2011

Ciarletta, P., Maugin, G.A.: Elements of a finite strain-gradient thermomechanical theory for material growth and remodeling. Int. J. Non-Linear Mech. 46(10), 1341–1346 (2011)

Ciarletta, P. and Ben Amar, M. [2012] “Papillary networks in the dermal–epidermal junction of skin: A biomechanical model,” *Mechanics Research Communications* 42, 68–76.

P. Ciarletta, L. Preziosi and G.A. Maugin, “Thermo-mechanics of growth and mass transfer: Morphogenesis of seashells”, *Computer Methods in Biomechanics and Biomedical Engineering*, Vol. 15, No. S1, pp 110-112, September 2012

Ciarletta P, Ben Amar M. Growth instabilities and folding in tubular organs: a variational method in non-linear elasticity. *Int J Non Linear Mech* 2012;47:248–257.

Ciarletta P., Ambrosi D., Maugin G.A., Mass transport in morphogenetic processes: A second gradient theory for volumetric growth and material remodeling, *J. Mech. Phys. Solids*, 60 (2012), pp. 432-450

P. Ciarletta and M. Ben Amar, Pattern formation in fiber-reinforced tubular tissues: Folding and segmentation during epithelial growth, *J. Mech. Phys. Solids* 60, 525-537 (2012).

Pasquale Ciarletta and Martine Ben Amar, “Peristaltic patterns for swelling and shrinking of soft cylindrical gels”, *Soft Matter*, Vol. 8, pp 1760-1763, 2012

Ciarletta P. Buckling Instability in Growing Tumor Spheroids. *Physical review letters* 110, 158102 (2013).

Ciarletta P, Destrade M, Gower AL. 2013 Shear instability in skin tissue. *Q. J. Mech. Appl. Math.* 66, 273–288.

Balbi, V. and P. Ciarletta, Morpho-elasticity of intestinal villi. *Journal of the Royal Society Interface*, 2013. 10: p. 20130109.

Ciarletta, P., Preziosi, L., Maugin, G.A.: *Mechanobiology of interfacial growth*. *J. Mech. Phys. Solids* 61(3), 852–872 (2013)

Balbi, V. and P. Ciarletta, Helical buckling of thick-walled, prestressed, cylindrical tubes under a finite torsion. *Mathematics and Mechanics of Solids*, 2014: p. 1-17.

Ciarletta, P., V. Balbi, and E. Kuhl, Pattern Selection in Growing Tubular Tissues. *Physical Review Letters*, 2014. 113(24), 248101.

P. Ciarletta, M. Destrade, Torsion instability of soft solid cylinders, *IMA J. Appl. Math.*, 79 (5) (2014), pp. 804-819

P. Ciarletta, “Wrinkle-to-fold transition in soft layers under equi-biaxial strain: A weakly nonlinear analysis”, *Journal of the Mechanics and Physics of Solids*, Vol. 73, pp 118-133, December 2014

Fu YB, Ciarletta P. 2015 Buckling of a coated elastic half-space when the coating and substrate have similar material properties. *Proc. R. Soc. A* 471, 20140979.

Balbi V., Kuhl E., Ciarletta P., Morphoelastic control of gastro-intestinal organogenesis: Theoretical predictions and numerical insights, *J. Mech. Phys. Solids*, 78 (2015), pp. 493-510

P. Ciarletta, M. Destrade, A.L. Gower and M. Taffetani, “Morphology of residually stressed tubular tissues: Beyond the elastic multiplicative decomposition”, *Journal of the Mechanics and Physics of Solids*, Vol. 90, pp 242-253, May 2016