CURRICULUM VITAE

NIKOLAOS ARAVAS

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PERSONAL DATA

Date of Birth: December 6, 1957
Place of Birth: Thessaloniki, Greece
                                U.S. citizen

EDUCATION

1980-1984   University of Illinois at Urbana-Champaign
Degrees: Masters of Science in Theoretical and Applied Mechanics — 1982
                          Grade Point Average: 5.00/5.00

                          Ph.D. in Theoretical and Applied Mechanics — 1984
                          Grade Point Average: 5.00/5.00
                          Ph.D. subject: A numerical study of the influence of void growth on ductile fracture
                                                    and metal extrusion
                          Thesis Advisor: R. M. McMeeking

1975−1980   Aristotle University of Thessaloniki, Thessaloniki, Greece
Degree: B.S. (Mechanical Engineering)
                          Grade Point Average: 9.3/10.00
                          (Graduate 1st in class)

EXPERIENCE

8/2014−present   Visiting Professor
                              University of Pennsylvania
                              Department of Mechanical Engineering and Applied Mechanics, USA

2013−present   Adjunct Professor
                              University of Illinois at Urbana-Champaign
                              Department of Mechanical Science and Engineering, USA

2011−present   World Premier International (WPI) Professor
                              Research Center Initiative
                              International Institute for Carbon-Neutral Energy Research (I2CNER)
                              Kyushu University, Fukuoka, Japan

9/1996−present	Professor of Computational Mechanics Department of Mechanical Engineering University of Thessaly, Greece
8/2007−1/2008	Visiting Professor University of Illinois at Urbana-Champaign Department of Mechanical Science and Engineering, USA
6/2004−8/2007	Dean of Engineering University of Thessaly, Greece
1/2006−3/2012	Director of Mechatronics Institute Center for Research and Technology – Thessaly (CE.RE.TE.TH.), Greece
10/2000−6/2002	Acting Chairman Department of Computer and Communication Engineering University of Thessaly, Greece
12/2000−12/2001	Acting Chairman Department of Civil Engineering University of Thessaly, Greece
1999−8/2002	Vice Rector for Research and Development University of Thessaly, Greece
1999−8/2002	Chairman of the Research Committee University of Thessaly, Greece
10/1998−3/1999	Chairman Department of Mechanical Engineering University of Thessaly, Greece
1996−1998	Vice Chairman the Research Committee University of Thessaly, Greece
1992−1996	Associate Professor (with tenure) University of Pennsylvania Department of Mechanical Engineering and Applied Mechanics (secondary appointment in the Department of Materials Science and Engineering)
1986−1992	Assistant Professor University of Pennsylvania Department of Mechanical Engineering and Applied Mechanics (secondary appointment in the Department of Materials Science and Engineering)
1985	Senior Engineer ABAQUS Hibbitt, Karlsson and Sorensen, Inc. Providence, RI U.S.A.
1982-1984	Research Assistant University of Illinois at Urbana-Champaign Department of Theoretical and Applied Mechanics

1980-1982	Teaching Assistant
	University of Illinois at Urbana-Champaign
	Department of Theoretical and Applied Mechanics

1978	Assistant Engineer (Summer Appointment)
	Esso-Pappas Oil Refinery
	Thessaloniki, Greece

1977	Assistant Engineer (Summer Appointment)
	Deutsche Bundesbahn
	Nurnberg, Germany

RESEARCH INTERESTS

Mechanics of Materials, Computational Mechanics, Finite Element Methods, Plasticity, Continuum Mechanics, Fracture Mechanics, Metal Forming, Biomechanics, Applied Mathematics.

AWARDS AND HONORS

2010	Fellow of the American Society of Mechanical Engineers (ASME)
2010	Distinguished Alumni Award
	Department of Mechanical Science and Engineering
	University of Illinois at Urbana Champaign
1987	Presidential Young Investigator Award (USA)
1982	J. O. Smith Award for Teaching Excellence
	Department of Theoretical and Applied Mechanics
	University of Illinois at Urbana-Champaign
1975−1980	Greek government merit scholarship (award to top 5% in class)
1976	Greek Technical Chamber Award

BOOKS

[1] N.Aravas, "Cartesian Tensors", University of Thessaly Press, 2005 (in Greek)

[2] N. Aravas, "Mechanics of Materials: Vol. 1 – Introduction to the Mechanics of Deformable Solids and Linear Elasticity", Tziolas Publucations, Thessaloniki, Greece, 2014 (in Greek)

[3] N. Aravas, "Mechanics of Materials: Vol. 2 – Elastic Analysis of Beams", University of Thessaly Press, 2008 (in Greek)

EDITORIAL BOARD

Associate Editor of the ASME *Journal of Applied Mechanics* (2011-2017)

CITATIONS IN ISI

More than 2100 *citations*, *h-index* 25, 30.5 *average citations per article* (all in ISI).

JOURNAL PUBLICATIONS

[1] N. Aravas and R.M. McMeeking, "Finite element analysis of void growth near a blunting crack," *Journal of the Mechanics and Physics of Solids*, Vol. **33**, pp. 25−49, 1985.

[2] N. Aravas and R.M. McMeeking, "Microvoid growth and failure in the ligament between a hole and a blunt crack tip," *International Journal of Fracture*, Vol. **29**, pp. 21−38, 1985.

[3] N. Aravas and R.M. McMeeking, "Stress intensity factors for slightly kinked, partially closed cracks in compression," *International Journal of Solids and Structures*, Vol. **22**, pp. 1279−1292, 1986.

[4] N. Aravas, "The analysis of void growth that leads to central bursts during extrusion," *Journal of the Mechanics and Physics of Solids*, Vol. **34**, pp. 55−79, 1986.

[5] N. Aravas, "On the numerical integration of a class of pressure dependent plasticity models," *International Journal for Numerical Methods in Engineering*, Vol. **24**, pp. 1395−1416, 1987.

[6] K-S. Kim and N. Aravas, "Elasto-plastic analysis of the peel test," *International Journal of Solids and Structures*, Vol. **24**, pp. 417−435, 1988.

[7] N. Aravas, K-S. Kim and M.J. Loukis, "On the mechanics of adhesion testing of flexible films," *Materials Science and Engineering*, Vol. **107**, pp. 159−168, 1989.

[8] N. Aravas and R.M. McMeeking, "An asymptotic analysis of three-dimensional extrusion," *Journal of Applied Mechanics*, Vol. **56**, pp. 519−526, 1989.

[9] N. Aravas, K-S. Kim and F.A. Leckie, "On the calculation of the stored energy of cold work," *Journal of Engineering Materials and Technology*, Vol. **112**, pp. 465−470, 1990.

[10] N. Aravas and E.C. Aifantis, "On the geometry of slip and spin in finite plastic deformation," *International Journal of Plasticity*, Vol. **7**, pp. 141−160, 1991.

[11] N. Aravas and S.M. Sharma, "An elastoplastic analysis of the interface crack with contact zones," *Journal of the Mechanics and Physics of Solids*, Vol. **39**, pp. 311−344, 1991.

[12] R.M. Govindarajan and N. Aravas, "An asymptotic analysis of extrusion of porous metals," *International Journal of Mechanical Sciences*, Vol. **33**, pp. 505−527, 1991.

[13] M.J. Loukis and N. Aravas, "The effects of viscoelasticity in the peeling of polymeric films," *Journal of Adhesion*, Vol. **35**, pp. 7−22, 1991.

[14] S.M. Sharma and N. Aravas, "Determination of higher order terms in asymptotic elastoplastic crack tip solutions," *Journal of the Mechanics of Physics of Solids,* Vol. **39**, pp. 1043−1072, 1991.

[15] N. Aravas and D.A. Blazo, "Higher order terms in asymptotic elastoplastic mode-III crack tip solutions," *Acta Mechanica*, Vol. **90**, pp. 139−153, 1991.

[16] S.M. Sharma and N. Aravas, "Plane stress elastoplastic solutions of the interface crack with contact zones," *Mechanics of Materials*, Vol. **12**, pp. 147−163, 1991.

[17] N. Aravas, "Finite elastoplastic transformations of transversely isotropic metals," *International Journal of Solids and Structures*, Vol. **29**, pp. 2137−2157, 1992.

[18] S.M. Sharma and N. Aravas, "On the development of variable-separable asymptotic elastoplastic solutions for interfacial cracks," *International Journal of Solids and Structures*, Vol. **30**, pp. 694−723, 1993.

[19] J.J. Pereda, N. Aravas and J.L. Bassani, "Finite deformations of anisotropic polymers," *Mechanics of Materials*, Vol. **15**, pp. 3−20, 1993.

[20] S.M. Sharma, A.K. Srivastava and N. Aravas, "Higher order crack tip asymptotic solutions for quasi-static steady crack growth in nonlinear viscous solids," *Journal of the Mechanics and Physics of Solids,* Vol. **42**, pp. 159−179, 1994.

[21] R.M. Govindarajan and N. Aravas, "Deformation processing of metal powders: Part I − Cold Isostatic Pressing," *International Journal of Mechanical Sciences*, Vol. **36**, pp. 343−357, 1994.

[22] R.M. Govindarajan and N. Aravas, "Deformation processing of metal powders: Part II − Hot Isostatic Pressing," *International Journal of Mechanical Sciences*, Vol. **36**, pp. 359−372, 1994.

[23] N. Aravas, "Finite strain anisotropic plasticity and the plastic spin," *Modelling and Simulation in Materials Science*, Vol. **2**, pp. 483−504, 1994.

[24] S.M. Sharma, N. Aravas and M.G. Zelman, "Two-parameter characterization of crack tip fields in edge-cracked geometries: Plasticity and creep solutions," *Fracture Mechanics 25th Volume, ASTM STP 1220,* pp. 309−327, 1995.

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[29] S. Ramaswamy and N. Aravas, "Finite element implementation of gradient plasticity models − Part I: Gradient-dependent yield functions," *Computer Methods in Applied Mechanics and Engineering*, Vol. **163**, pp. 11−32, 1998.

[30] S. Ramaswamy and N. Aravas, "Finite element implementation of gradient plasticity models − Part II: Gradient-dependent evolution equations," *Computer Methods in Applied Mechanics and Engineering*, Vol. **163**, pp. 33−53, 1998.

[31] M. Kailasam, N. Aravas and P. Ponte Castañeda, "Porous metals with developing anisotropy: Constitutive models, computational issues and application to deformation processing," *Computer Modeling in Engineering and Sciences*, Vol. **1**, pp. 105−118, 2000.

[32] D. Boussaa and N. Aravas, "A numeric-symbolic approach to the problem of localization of plastic flow", *Computational Mechanics*, Vol. **27**, pp. 324−331, 2001.

[33] P. Sofronis, Y. Liang and N. Aravas, "Hydrogen induced shear localization of the plastic flow in metals and alloys," *European Journal of Mechanics/A Solids*, Vol. **20**, pp. 857−872, 2001.

[34] E. Amanatidou and N. Aravas, "Mixed finite element formulations of strain-gradient elasticity problems," *Computer Methods in Applied Mechanics and Engineering*, Vol. **191**, pp. 1723−1751, 2002.

[35] G. Pontikakis, A. Stamatelos, K. Bakasis and N. Aravas, "3-D catalytic regeneration and stress modelling of diesel particulate filters by ABAQUS FEM software", *Journal of Fuels and Lubricants (SAE 2002 Transactions)*, pp. 458−470, 2002.

[36] Y. Liang, P. Sofronis and N. Aravas, "On the effect of hydrogen on plastic instabilities in metals," *Acta Materialia*, Vol. **51**, pp. 2717−2730, 2003.

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[38] I. Papatriantafillou, N. Aravas and G.N. Haidemenopoulos, "Finite element modeling of TRIP steels," *Steel Research*, Vol. **75**, pp. 732−738, 2004.

[39] A.I. Katsamas, G.N. Haidemenopoulos and N. Aravas, "Transformation modeling in TRIP steels," *Steel Research*, Vol. **75**, pp. 739−745, 2004.

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ticity and the corresponding Saint-Venant theorem", *International Journal of Solids and Structures*, Vol. **43**, pp. 3875−3894, 2006.

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[44] F. Xu, P. Sofronis, N. Aravas and S. Meyer, "Constitutive modeling of porous viscoelastic materials," *European Journal of Mechanics/A Solids*, Vol. **26**, pp. 936−955, 2007.

[45] F. Xu, N. Aravas and P. Sofronis, "Constitutive modeling of solid propellant materials with evolving microstructural damage," *Journal of the Mechanics and Physics of Solids,* Vol. **56**, pp. 2050−2073, 2007.

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[47] N. Aravas and A.E. Giannakopoulos, "Plane asymptotic crack-tip solutions in gradient elasticity," *International Journal of Solids and Structures*, Vol. **46**, pp. 4478−4503, 2009.

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[52] A. Bassi, N. Aravas and F. Genna, "A Linear Complementarity formulation of rate-independent finite-strain elastoplasticity. Part II: Calculation of bifurcation and limit points," *European Journal of Mechanics/A Solids*, Vol. 35, pp. 128−137, 2012.

[53] K. Danas and N. Aravas, "Numerical modeling of elasto-plastic porous materials with void shape effects at finite deformations," *Composites Part B*: *Engineering*, Vol. **43**, pp. 2544−2559, 2012.

[54] L.A. Spyrou and N. Aravas, "Muscle-driven finite element simulation of human foot movements", *Computer Methods in Biomechanics and Biomedical Engineering*, Vol. **15**, pp. 925-934, 2012. [DOI: 10.1080/10255842.2011.566564]

[55] A.E. Giannakopoulos, N. Aravas, A. Papageorgopoulou, and I. Vardoulakis, "A structural gradient theory of torsion, the effects of pretwist, and the tension of pretwisted-DNA", *International Journal of Solids and Structures*, Vol. **50**, pp. 3911−3933, 2013.

[56] C.S. Laspidou, L.A. Spyrou, N. Aravas, and B.E. Rittmannm, "Mechanical modeling of biofilm mechanical properties", *Mathematical Biosciences*, Vol. **251**, pp. 11−15, 2014.

[57] L.A. Spyrou, P. Sarafoglou, N. Aravas, and G.N. Haidemenopoulos, "Evaluation of creep damage of INCOLOY 800HT pigtails in a refinery steam reformer unit", *Engineering Failure Analysis*, Vol. **45**, pp. 456−469, 2014.

[58] G.N. Haidemenopoulos, N. Aravas, and I. Bellas, "Kinetics of strain-induced transformation of dispersed austenite in low-alloy TRIP steels", *Materials Science and Engineering A*, Vol. **615**, pp. 416−423, 2014.

[59] L.A. Spyrou and N. Aravas, "Thermo-mechanical modeling of laser spot welded solar absorbers", *ASME Journal of Manufacturing Science and Engineering*, Vol. **137** Issue 1, Article number 011016, pp. 1−15, 2015.

[60] A. Kordolemis, N. Aravas, and A.E. Giannakopoulos, "Pretwisted beams in axial tension and torsion: An analogy with dipolar gradient elasticity and applications to textile materials", *ASCE Journal of Engineering Mechanics*, Vol. **141** Issue 10, Article number 04015036, pp. 1−13, 2015. [DOI: 10.1061/(ASCE)EM.1943-7889.0000917]

[61] I. Papadioti, K. Danas, and N. Aravas, "A methodology for the estimation of the effective yield function of isotropic composites", *International Journal of Solids and Structures*, Vol. **87**, pp. 120−138, 2016. [DOI: 10.1016/j.ijsolstr.2016.02.022]

[62] S. Mao, P.K. Purohit, and N. Aravas, "Mixed finite element formulations in piezoelectricity and flexoelectricity", *Proceedings of the Royal Society A*, Vol. **472** Issue 2190, Article Number 20150879, 2016. [DOI: 10.1098/rspa.2015.0879]

[63] A. Kordolemis, A.E. Giannakopoulos, and N. Aravas, "Pretwisted beam subjected to thermal loads: A gradient thermoelastic analogue", *Journal of Thermal Stresses*, Vol. **40**, pp. 1231−1253, 2017. [DOI: 10.1080/01495739.2017.1308810]

[64] J. Lian, W. Liu, I. Papadioti, I. Bellas, S. Chandran, P. Verleysen, H. Richter, N. Aravas, and S. Münstermann, "Plasticity and failure behavior modeling of high-strength steels under various strain rates and temperatures: microstructure to components", *Structural Integrity Procedia*, Vol. **13**, pp. 1421−1426, 2018. [DOI: 10.1016/j.prostr.2018.12.295]

[65] I. Papadioti, N. Aravas, J. Lian, and S. Münstermann, "A strain-gradient isotropic elastoplastic damage model with J_3 dependence", *International Journal of Solids and Structures,* Vol. **174-175**, pp. 98−127, 2019. [DOI: 10.1016/j.ijsolstr.2019.05.027]

[66] W. Liu, J. Lian, N. Aravas, and S. Münstermann, "A strategy for synthetic microstructure generation and crystal plasticity parameter calibration of fine-grain-structured dual-phase steel", accepted for publication in the *International Journal of Plasticity,* 2019.

[67] I. Papadioti, E. Bellas, M-I.T. Tzini, P.I. Christodoulou, and N. Aravas, "TRIP steels: A multiscale computational simulation and experimental study of heat treatment and mechanical behavior", submitted for publication in *Materials,* 2019.

PUBLICATIONS IN CONFERENCE PROCEEDINGS

[C1] N. Aravas and R.M. McMeeking, "On crack tip blunting and ductile void growth," Proceedings of the *Third Irish Durability and Fracture Conference on Durability of Engineering Materials*, 26−27 September 1985, University College, Galway, Ireland.

[C2] R.M. McMeeking and N. Aravas, "Models of ductile rupture," Proceedings of the *Tenth U.S. National Conference of Applied Mechanics*, 16−20 June, 1986, University of Texas at Austin, Austin, Texas.

[C3] N. Aravas, "A finite strain plasticity theory for transversely isotropic materials," in Anisotropy and Localization of Plastic Deformation, Proceedings of Plasticity '91: *The Third International Symposium on Plasticity and its Current Applications*, Grenoble, France 12−16 August 1991, edited by J-P. Boehler and A.S. Khan, pp. 7−10, Elsevier, 1991.

[C4] N. Aravas, "Finite strain anisotropic plasticity: Constitutive equations and computational issues," *Advances in Finite Deformation Problems in Materials Processing and Structures*, edited by N. Chandra and J.N. Reddy, pp. 25−32, ASME, 1991.

[C5] R.M. Govindarajan and N. Aravas, "Asymptotic analysis and numerical simulation of deformation processing of porous metals," *Finite Inelastic Deformations — Theory and Applications, IUTAM-Symposium 1991*, Hannover, Germany, 19−23 August 1991, edited by D. Besdo and E. Stein, pp.

5−66, Springer-Verlag, 1992.

[C6] R.M. Govindarajan and N. Aravas, "Finite element analysis of cold- and hot-isostatic pressing," Proceedings of the *Hot Isostatic Pressing '93 Congress,* Antwerp, Belgium, 21−23 April, 1993, edited by L. Delay, H. Tas and W. Kaysser, pp. 29−36, Elsevier Science Publishers B.V., 1993.

[C7] N. Aravas, "Use of pressure-dependent plasticity models in ABAQUS," *ABAQUS User's Conference Proceedings*, Newport, RI, May 29−31, 1996, Publisher: Hibbitt, Karlsson & Sorensen, pp. 1−15, 1996.

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[C9] P. Sofronis and N. Aravas, "Hydrogen enhanced localized plasticity," *Proceedings of the 3rd National Congress on Computational Mechanics*, Volos Greece, June 24−26, 1999, edited by N. Aravas and J.T. Katsikadelis, pp. 129−136, 1999.

[C10] Dj. Boussaa and N. Aravas, "A symbolic-numeric approach to the problem of localization of plastic flow," Proceedings of the 3rd *National Congress on Computational Mechanics*, Volos Greece, June 24−26, 1999, edited by N. Aravas and J.T. Katsikadelis, pp. 171−178, 1999.

[C11] M.Y. Liang, P. Sofronis, and N. Aravas, "Numerical modeling of hydrogen induced shear localization," *Chemistry and Electrochemistry of Stress Corrosion Cracking*: A Symposium Honoring the Contributions of R. W. Staehle, edited by R. H. Jones, TMS (The Minerals, Metals and Materials Society), 2001.

[C12] P. Sofronis, I.M. Robertson, Y. Liang, D.F. Teter, and N. Aravas, "Some recent Advances at Illinois on hydrogen induced shear localization and decohesion," *Jackson Hole International Conference on Hydrogen*, 2001.

[C13] E. Amanatidou and N. Aravas, "Finite element techniques for gradient elasticity problems", *Proceedings of the 6th Greek Congress of Mechanics*, Vol. 2, pp. 149−154, 2001.

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[C15] S.A. Karamanos and N. Aravas, "Numerical implementation of large-strain elastoplastic models for nonlinear shell analysis," *Proceedings of the 4th National Congress on Computational Mechanics*, Patras, Greece, June 27−29, 2002.

[C16] E. Amanatidou, A. Giannakopoulos, and N. Aravas, "Finite element models of strain-gradient elasticity: Accuracy and error estimates", *Proceedings of the 5th National Congress on Computational Mechanics*, edited by G. Georgiou, P. Papanastasiou and M. Papadrakakis, pp. 797−804, 2005.

[C17] N. Aravas, F. Xu, P. Sofronis, A. Namazifad, and R. Fiedler, "Constitutive response and damage in solid propellants", *41st AIAA/ASME/SAE/ASEE Joint Propulsion Conference & Exhibit*, 10−13 July 2005, Tucson, Arizona.

[C18] F. Xu, P. Sofronis, N. Aravas, A. Namazifad, and R. Fiedler, "Finite element modeling of porous solid propellants", *41st AIAA/ASME/SAE/ASEE Joint Propulsion Conference & Exhibit*, 10−13 July 2005, Tucson, Arizona.

[C19] R. Fiedler, A. Namazifard, N. Aravas, P. Sofronis, and F. Xu, "Detailed Simulation of Propellant Slumping in the Titan IV SRMU PQM-1", *Proceeding of the AIAA Joint Propulsion Conference*, AIAA-2006-4592, July 2006.

[C20] F. Xu, P. Sofronis, and N. Aravas, "Micromechanics of Damage Evolution in Solid Propellants," "Fracture of Nano and Engineering Materials and Structures", *Proceeding of the 16th European*

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[C21]   S. Gaitanaros, G. Karaiskos, C. Papadimitriou, and N. Aravas, "Crack Identification in Structures using Optimal Experimental Design", *Proceedings of the 6ᵗʰ International Workshop on Structural Health Monitoring*, Fu Ko Chang (Editor), DEStech Publications, pp. 653−661, 2007.

[C22]   G. Haidemenopoulos, A. Katsamas, and N. Aravas, "Multiscaling effects in low alloy TRIP steels", *Multiscaling in Molecular and Continuum Mechanics: Interaction of Time and Size from Macro to Nano*, G.C. Sih (Editor), pp. 161−178, Springer 2007.

[C23]   L.A. Spyrou, N. Aravas, K. Malizos, and E. Choustis, "Three-dimensional finite element model of human foot during gait", *Proceedings of the 2ⁿᵈ Congress of the Greek Society of Biomechanics*, Ancient Olympia, Greece, 2007.

[C24]   L.A. Spyrou and N. Aravas, "Constitutive modeling and computational analysis of muscle tissue", *Proceedings of the 15ᵗʰ Workshop on FEM in Biomedical Engineering, Biomechanics and Related Fields*, pp. 63–70, Ulm, Germany, 2008.

[C25]   L.A. Spyrou and N. Aravas, "Constitutive modeling and computational analysis of muscle tissue", *Proceedings of the XXXVII European Muscle Conference of the European Society for Muscle Research*, In: *Journal of Muscle Research and Cell Motility*, Vol. 29, p. 287, Oxford, UK, 2008.

[C26]   L.A. Spyrou and N. Aravas, "Constitutive modeling and computational analysis of muscle tissue", *Proceedings of the 3ʳᵈ Congress of the Greek Society of Biomechanics*, Athens, Greece, 2008.

[C27]   L.A. Spyrou and N. Aravas, "Constitutive modeling of muscle tissue and finite element analysis of foot during gait", *Proceedings of the 1ˢᵗ Local ABAQUS Users Conference*, Athens, Greece, 2008.

[C28]   S.D. Koumpoyiannis, N. Aravas, S. Varitimidis, K.N. Malizos, and E.N. Houstis, "Prognosis of collapse of the osteonecrosis of the femoral head for patients treated with a tantalum rod by determining location and size of the lesion", *9ᵗʰ International Conference on Information Technology and Applications in Biomedicine* (ITAB 2009), Paper no. 75, Larnaca, Cyprus, 2009.

[C29]   S.D. Koumpoyiannis, N. Aravas, S. Varitimidis, E.N. Houstis, V. Bagiatis, and K.N. Malizos, "Significance of size and location of the lesion for prognosis of collapse of osteonecrosis of the femoral head for patients treated with tantalum rod", in *"Advanced Topics in Scattering Theory and Biomedical Engineering"*, *Proceedings of the 9ᵗʰ International Workshop on Mathematical Methods in Scattering Theory and Biomedical Engineering*, A. Charalambopoulos, D.I.Fotiadis, and D. Polyzos (Editors), pp. 69−70, October 9−11, Patras, Greece, 2009.

[C30]   S.D. Koumpoyiannis, N. Aravas, E.N. Houstis, S. Varitimidis, and K.N. Malizos, "The importance of determining location and size of the lesion for the prognosis of collapse of the osteonecrosis of the femoral head for patients treated with a tantalum rod. A 1 to 7 year follow up", *10ᵗʰ EFORT Congress*, e-poster no. P406, Vienna, Austria, 2009.

[C31]   L.A. Spyrou and N. Aravas, "On the dynamic modeling of skeletal muscle", *Proceedings of the 4ᵗʰ Congress of the Greek Society of Biomaterials*, Athens, Greece, 2009.

[C32]   L.A. Spyrou and N. Aravas, "Muscle and tendon tissues: Constitutive modeling and computational issues", *Proceedings of the 9ᵗʰ HSTAM International Congress on Mechanics*, pp. 393–400, Limassol, Cyprus, 2010.

[C33]   L.A. Spyrou and N. Aravas, "Muscle and tendon tissues: Constitutive modeling and computational issues", *Proceedings of the 4ᵗʰ Congress of the Greek Society of Biomechanics*, Ioannina, Greece, 2010.

[C34]   S.D. Koumpoyiannis, N. Aravas, E.N. Houstis, T. Moraitis, S. Varitimidis, and K.N. Malizos, "Prediction of collapse of the osteonecrosis of the hip by determining location and size of the lesion. A 2 to 17 years study", *10ᵗʰ IEEE International Conference on Information Technology and Applications in Biomedicine* (ITAB 2010), 3−5 November 2010, Corfu, Greece.

[C35]   L.A. Spyrou and N. Aravas, "On the constitutive modeling of skeletal muscle and tendon tissues",

*Proceedings of the 16t*ʰ *U.S. National Congress of Theoretical and Applied Mechanics*, Penn State, USA, 2010.

[C36] G. Tsantidis and N. Aravas, "Cracked-panel solutions in gradient elasticity", *2nd International Conference of Engineering Against Fracture*, 22−24 June 2011, Mykonos, Greece.

[C37] Th. Toumanidou, L.A. Spyrou, and N. Aravas, "A Finite Element Model of the Ilizarov Fixator System", *10th International Workshop on Biomedical Engineering*, 5−7 October 2011, Kos Island, Greece.

[C38] L.A. Spyrou and N. Aravas, "Muscle-driven finite element simulation of human foot movements", *Proceedings of the XXIII Congress of the International Society of Biomechanics*, Brussels, Belgium, 2011.

[C39] A. Giompliakis, I. Papadioti, K. Danas, and N. Aravas, "Constitutive modeling of TRIP steels", *5th Conference of Metallic Materials*, 20−22 November 2013, University of Thessaly, Volos, Greece.

[C40] C.S. Laspidou, L.A. Spyrou, N. Aravas, and B.E. Rittmann, "Simulation Material Modeling of Biofilm Mechanical Properties", *10th IWA Leading Edge Conference on Water and Waste Water Technologies*, Bordeaux, France, 2013.

[C41] I. Papadioti, K. Danas, and N. Aravas, "Non-linear homogenization methods for the constitutive modeling of multiphase steels", *2nd International Conference on High Manganese Steel*, Aachen, Germany, 2014.

[C42] I. Papadioti, K. Danas, and N. Aravas, "Non-linear homogenization methods for the constitutive modeling of multiphase steels", *8th GRACM International Congress on Computational Mechanics*, 2015.

[C43] I. Papadioti, K. Danas, and N. Aravas, "A methodology for the estimation of the effective yield function of isotropic composites with applications to TRIP steels", *6th Pan Hellenic Conference on Metallic Materials*, Ioannina, Greece, 2016.

[C44] I. Papadioti, K. Danas, and N. Aravas, "Estimation of the effective yield function of isotropic composites", *EMI International Conference*, Metz, France, 2016.

[C45] N. Aravas, M. Seng, and P. Purohit, "Finite element methods for piezoelectricity and flexoelectricity with fracture mechanics", *14th International Conference on Fracture*, Rhodes, Greece, June 18−23, 2017.

[C46] J. Lian, W. Liu. I. Papadioti, S. Chandran, P. Verleysen, G. Paul, H. Richter, and S. Münstermann, "Integrated material modelling on the crashworthiness for automotive high-strength steel sheets", *14th International Conference on Fracture*, Rhodes, Greece, June 18−23, 2017.

[C47] I. Papadioti, I. Bellas, M-I.T. Tzini, P.I. Christodoulou and N. Aravas, "Non-linear homogenization theories with applications to TRIP steels", *9th GRACM International Congress on Computational Mechanics*, Chania, Greece, June 4 - June 6, 2018.

ENGINEERING CONSULTANT

IBM, USA	: Fracture analysis of metal and ceramic elements
Aluminum Company of America (ALCOA), USA	: Metal Forming
Chemical Industries of Northern Greece	: Analysis of steel structures and pipelines
NIK. KIOLEIDES, Greece	: Analysis and design of fuel tanks and trucks
ATTIKO METRO AE, Greece	: Fracture analysis of conductor rails
MOTOR OIL, Greece	: Analysis of creep damage of outlet pigtails
PRIME LASER TECHNOLOGY ABEE, Greece	: Modeling of laser spot welded solar absorbers
Höganäs AB, Sweeden	: Constitutive modeling of metal powders

REVIEWER FOR

Acta Mechanica

Acta Metallurgica et Materialia

Composite Structures

Computational Materials Science

Computational Mechanics

Computer Methods and Programs in Biomedicine

Computer Methods in Applied Mechanics and Engineering

Computer Methods in Biomechanics and Biomedical Engineering

Continuum Mechanics and Thermodynamics

European Journal of Mechanics. A/Solids

Fatigue and Fracture of Engineering Materials and Structures

International Journal for Numerical Methods in Engineering

International Journal of Computational Engineering Science

International Journal of Damage Mechanics

International Journal of Engineering Science

International Journal of Fracture

International Journal of Non-Linear Mechanics

International Journal of Solids and Structures

Journal of Adhesion Science and Technology

Journal of Applied Mechanics (ASME)

Journal of Biomedical Materials Research: Part A

Journal of Computing and Information Science in Engineering (ASME)

Journal of Engineering Mechanics (ASCE)

Journal of Manufacturing Science and Engineering (ASME)

Journal of Pressure Vessel Technology (ASME)

Journal of the Mechanics and Physics of Solids

Journal of the Royal Society − Interface

Materials and Design

Mathematical Problems in Engineering

Meccanica

Mechanics of Materials

Mechanics Research Communications

Metallurgical Transactions

Modelling and Simulation in Materials Science and Engineering

Proceedings of the Royal Society, London

Structural Engineering and Mechanics

The Journal of Adhesion

American Society of Testing and Materials (ASTM)

National Science Foundation (NSF)

U.S. Army Research Office (ARO)

General Secretariat for Research and Technology (GSRT), Greece

Ministry of Education, Greece

RESEARCH GRANTS

- "TRIP Steels: Modeling and experimental study of processing and mechanical behavior", Greek General Secretariat for Research and Technology (GSRT), 72.100 €, 2017–2019.

- "Development of affordable integrated lightweight components from flexible 3G medium-Mn steels", RFCS-2016 749918 European Commission, (Partners: RWTH-Aachen, Salzgitter Mannesmann Forschung GmbH, Centro Ricerche FIAT SCPA, Instituto de Soldadura e Qualidade (ISQ), Auto Tech (former GESTAMP)), 214.500 €, 2017–2020.

- "Toolkit for the design of damage tolerant microstructures", RFCS-2015 709711 European Commission, (Partners: R-WTH Aachen, Univ. Gent, ThyssenKrupp Steel AG, Ocas N.v., Solinourgeia Korinthou), 295.000 €, 01/07/2016–30/06/2019.

- "Smart Specialization and Development Pole of Thessaly Region: Research, Innovation, Strategies", TRIP Steel, 40.000 €, 1/9/2012–31/10/2015.

- "Pilot project for the management of changes in SMEs in the general section of industrial equipment", Hellenic Federation of Enterprises (SEV), 160.000 €, 3/2/2012−3/9/2012.

- "SunLaser: On line optimization of thermal solar system production", Greek General Secretariat for Research and Technology (GSRT), 102.000 €, 2010–2013.

- "Modelling of SFIT (Smart Fibers and Intelligent Textiles) textiles", Regional Innovation Pole of Thessaly, 33.100 €, 2007−2008.

- "INVENT: Mechatronics Prototyping Center (MPC)", Thessalia Region General Secretariat, 97.000 €, 01/02/2003–31/07/2003.

- "Control and Exploitation of the Bake – Hardening Effect in Multiphase High Strength Steels", European Union / ECSC, 90.000 €, 2002−2005.

- "Thermomechanical processing of hard aluminum alloys", Greek General Secretariat for Research and Technology, Program PENED, 40.000 €, 2002−2005.

- "Laboratory equipment for University of Thessaly 2000-2001", Greek Ministry of Education, 551.067,26 €, 25/10/2000 to 30/6/2002.

- "Development of the new Department of Computer Engineering and Telecommunications in the University of Thessaly", Greek Ministry of Education, 94.549.000 dr. (Greek drachmas).

- "Development of Department of Computer Engineering and Telecommunications in the University of Thessaly", Greek Ministry of Education, 50.00.000 dr.

- "Telecommunication Network of the University of Thessaly", Greek Ministry of Education, 33.556.139 dr.

- "Materials with microstructure: Constitutive modeling and computational aspects", Greek General Secretariat for Research and Technology/Program PENED 1999, total 54.330.000 dr., 01/01/2000−31/07/2001.

- "Network for the use of non-destructive techniques and finite element methods for quality control in aluminum extrusion industries", Greek General Secretariat for Research and Technology/ Program PENED 1999, 17.000.000 (UTH 1.248.650 dr.), 01/12/1999−30/06/2001.

- "Upgrading of the Undergraduate Program of the Department of Mechanical and Industrial Engineering, University of Thessaly", Greek Ministry of Education, Program EPEAEK I, 85.000.000 dr., 1998−2000.

- "Stress analysis of ammonia pipe networks", Chemical Companies of Northern Greece, 400.000 dr. 01/09/1999−30/03/2000.

- "Modern theories of plasticity: Constitutive equations and computational aspects", University of Thessaly/Research Committee, 800.000 dr., 1998−99.

- "Constitutive modeling of fiber reinforced materials" − Office of Naval Research through subagreement from the University of California Santa Barbara, $ 300.000, 1/7/1991 to 30/6/1996.

- "The mechanics of bimaterial interfaces" − National Science Foundation through the Laboratory for Research on the Structure of Matter (LRSM), University of Pennsylvania, $ 161.345, 1/7/1989−29/2/1992.

- "The mechanics of hot isostatic pressing (HIP) of intermetallic alloys" − BDM (A Ford Aerospace Company), $ 122.290, 1/3/1991−29/2/1992.

- "Mechanics of Interfaces" − National Science Foundation, Presidential Young Investigator Award, $ 250.000, 1/6/1987−31/5/1992.

- The ALCOA Foundation, Science Support Grant, $ 10.000, awarded June 1990.

- "The mechanics of adhesion testing of thin flexible films" − IBM, $ 86.371, 1/1/1989−31/12/1989.

- The ALCOA Foundation, Science Support Grant, $ 10.000, awarded June 1989.

- "Finite strain crack tip cavitation due to creep and diffusion" and "Elastoplastic analysis of the peel test" National Science Foundation through the Laboratory for Research on the Structure of Matter (LRSM), University of Pennsylvania (DMR-8519059), $ 165.789, 1/5/1986−30/6/1989.

- "The analysis of peeling of viscoelastic materials" − IBM, $ 50.000, 1/1/1988−31/12/1988 (with K-S. Kim, Univ. of Illinois).

- The ALCOA Foundation, Science Support Grant, $ 7.000, awarded June 1986.

SOCIETAL ACTIVITIES

- Co-Chairman of the 3rd National Congress on Computational Mechanics, June 1999, Volos, Greece.

- Co-Chairman of Symposium on Interdisciplinary Issues in Materials Processing and Manufacturing, ASME Winter Annual Meeting, December 1987, Boston, MA.

- Co-Chairman of session on the Mechanics of Cracks on Bimaterial Interfaces, 7th International Conference on Fracture (ICF), March 1989, Houston, TX.

- Co-organizer of 4 sessions on Interfacial Fracture Mechanics, Third ASME/ASCE Mechanics Conference, July 1989, La Jolla, CA.

- Co-organizer of 2 sessions on the Mechanics of Interfaces, SES Annual Meeting, October 1994, Texas A. M. University, College Station, TX.

- Member of the ASME Technical Committee on Mechanics of Materials Processing and Manufacturing.

- Member of the ASME Fracture Mechanics Committee.

INVITED LECTURES

"Finite element analysis of void growth near a blunting crack tip," Department of Mechanical Engineering, The City College of the City University of New York (CCNY), New York, NY, April 1984.

"On the influence of microvoid growth on ductile fracture and metal extrusion," Department of Aerospace Engineering and Engineering Mechanics, The University of Texas at Austin, Austin, TX, December 1984.

"Use of pressure dependent plasticity laws in metal forming and ductile fracture," Department of Mechanical Engineering, Carnegie-Mellon University, Pittsburgh, PA, March 1985.

"Use of pressure dependent plasticity laws in ductile fracture and metal extrusion," Department of Mechanical Engineering and Applied Mechanics, University of Pennsylvania, Philadelphia, PA, March 1985.

"On the influence of microvoid growth on ductile fracture and metal extrusion," Department of Mechanical Engineering, State University of New York at Stony Brook, Stony Brook, NY, March 1985.

"Aspects of pressure dependent plasticity models and ductile fracture," Department of Mechanical Engi-

neering, Program in Materials Science, University of California, Santa Barbara, CA, January 1986.

"Models of ductile rupture," Department of Materials Science and Mineral Engineering, University of California, Berkeley, CA, November 1986.

"On crack tip blunting and ductile void growth," Department of Civil Engineering, Polytechnic of Milan, Milan, ITALY, January 1987.

"The analysis of void growth that leads to central bursts during extrusion," Division of Engineering, Brown University, Providence, RI, March 1987.

"On the use and numerical implementation of pressure dependent plasticity models in metal forming," AL-COA, Fabricating Technology Division, Alcoa Center, PA, April 1987.

"Elastic plastic finite element analysis of the peel test," IBM T. J. Watson Research Center, Yorktown Heights, NY, June 1987.

"A new method of analysis of three-dimensional extrusion," Applied Mechanics Division, Aristoteleion University of Thessaloniki, Thessaloniki, GREECE, December 1987.

"The analysis of void growth that leads to central bursts during extrusion," Laboratoire de Mechanique et Technologie, E. N. S. de Cachan, Paris, FRANCE, January 1988.

"On the mechanics of adhesion testing of thin films," IBM T. J. Watson Research Center, Yorktown Heights, NY, June 1988.

"An asymptotic method of analysis of three-dimensional extrusion," ALCOA, Fabricating Technology Division, Alcoa Center, PA, July 1988.

"On the analysis of three-dimensional metal forming operations," Department of Mechanical Engineering and Engineering Mechanics, Michigan Technological University, Houghton, MI, September 1988.

"On the analysis of three-dimensional metal forming operations," Department of Civil Engineering and Operations Research, Princeton University, Princeton, NJ, December 1988.

"On the analysis of three-dimensional metal forming operations," Department of Mechanical Engineering, Johns Hopkins University, Baltimore, MD, April 1989.

"On the analysis of three-dimensional metal forming operations," Department of Civil Engineering, Rensselaer Polytechnic Institute, Troy, NY, November 1989.

"On the use of pressure dependent plasticity models in hot isostatic pressing," National Institute of Standards and Technology, Washington, D.C., November 1989.

"Elastoplastic analysis of the interface crack," Department of Polymer Science and Engineering, University of Massachusetts, Amherst, MA, October 1990.

"Determination of higher order terms in asymptotic elastoplastic crack tip solutions," Department of Mechanical Engineering and Engineering Mechanics, Michigan Technological University, Houghton, MI, October 1991.

"Determination of higher order terms in asymptotic elastoplastic crack tip solutions," Department of Mechanical Engineering, Georgia Tech, Atlanta, GA, December 1991.

"Nonlinear fracture mechanics of interfaces," Department of Theoretical and Applied Mechanics, Cornell University, Ithaca, NY, March 1993.

"Higher order asymptotics of crack tip fields," Division of Engineering, Brown University, Providence, RI, December 1993.

"Higher order asymptotics of crack tip fields," Department of Mechanical Engineering and Mechanics, Lehigh University, Bethlehem, PA, October 1994.

"Non-local theories of plasticity: Constitutive equations and computational techniques", Section of Mechanics, Department of Engineering Science, National Technical University of Athens, November 1997.

"Non-local theories of plasticity: Constitutive equations and computational techniques", Section of Mechanics, Department Civil Engineering, University of Patras, June 1998.

"Deformation-induced anisotropy in porous metals: Constitutive modeling and computational issues," Department of Aerospace Engineering and Engineering Mechanics, University of Texas at Austin, Austin, TX, November 2007.

"Constitutive modeling and finite element methods for TRIP steels," Department of Mechanical Engineering and Applied Mechanics, University of Pennsylvania, Philadelphia, PA, November 2007.

"Fracture mechanics and gradient elasticity: Asymptotic solutions and numerical techniques", Department of Materials Science and Engineering, University of Ioannina, May 2010.

"On the constitutive modeling of skeletal muscle and tendon tissues," Department of Mechanical Science and Engineering, University of Illinois at Urbana-Champaign, Urbana, IL, April 2011.

"Non-linear homogenization methods for the constitutive modeling of multiphase materials with applications to TRIP steels," Department of Aerospace Engineering, Texas A&M University, College Station, TX, January 2015.

"Strain-gradient elasticity: Constitutive modeling and numerical techniques," Department of Mechanical Engineering and Applied Mechanics, University of Pennsylvania, Philadelphia, PA, February 2015.

"Strain-gradient elasticity: Constitutive modeling and numerical techniques," Department of Mechanical Engineering and Applied Mechanics, University of Pennsylvania, Philadelphia, PA, February 2015.

"Non-linear homogenization methods for the constitutive modeling of multiphase materials with applications to TRIP steels," Department of Mechanical Engineering, The Petroleum Institute, Abu Dhabi, United Arab Emirates, April 2016.

"Non-linear homogenization methods for the constitutive modeling of multiphase materials with applications to TRIP steels," Department of Civil and Environmental Engineering, Louisiana State University, Baton Rouge, LA, April 2016.

"Non-linear homogenization methods for the constitutive modeling of multiphase materials with applications to TRIP steels," Department of Mechanical Engineering, University of Connecticut, Storrs, CT, September 2016.

TEACHING EXPERIENCE

Undergraduate Courses

University of Illinois at Urbana-Champaign
    Engineering Mechanics I - Statics (TAM 152)

University of Pennsylvania
    Introduction to Scientific Computation (ENGR 105)
    Engineering Mechanics I - Statics (MEAM 200)
    Mechanics of Solids (MEAM 354)
    Introduction to Finite Elements (MEAM 427)

University of Thessaly
    Mechanics of Materials I
    Mechanics of Materials II
    Finite Elements
    Mechanics/Statics
    Mechanics/Dynamics

Graduate Courses

University of Illinois at Urbana-Champaign

Plasticity (TAM 554)

University of Pennsylvania
    Engineering Mathematics I (MEAM 500)
    Numerical Methods (ENM 502)
    Elasticity I (MEAM 519)
    Finite Element Analysis (MEAM 527)
    Topics in Computational Science and Engineering (ENM 540)
    Continuum Mechanics (MEAM 630)
    Elasticity II (MEAM 631)
    Plasticity and Creep (MEAM 632)
    Fracture Mechanics (MEAM 633)

University of Thessaly
    Continuum Mechanics
    Fracture Mechanics
    Plasticity

DOCTORAL DISSERTATION SUPERVISION

- Srivatsa M. Sharma, "On the mechanics of bimaterial interfaces," (July 1991)

- Rajasekeran Govindarajan, "Deformation processing of porous metals," (August 1992)

- Cao Cheng, "Creep of fiber reinforced metal-matrix composites," (June 1996)

- Sreeganesh Ramaswamy, "Length scale effects in plasticity − Constitutive models and computational issues," (December 1996)

- Eleni Amanatidou, "Non-local theories of elasticity: Constitutive equations and computational techniques", (September 2001)

- Andrea Bassi, "Problems of bifurcations in elastoplastic solids under finite deformations" (co-advisor with Prof. F. Genna), University of Milano, Italy, (January 2003).

- Yiannis Papatriantafillou, "TRIP steels: Constitutive modeling and computational issues", (July 2005)

- Leonidas Spyrou, "Muscle and tendon tissues: constitutive modeling, numerical implementation and applications", (September 2009)

- Papadioti Ioanna, "Non-linear homogenization theories with applications to TRIP steels", (October 2016)
- Tsantidis George, "Numerical methods for strain gradient elasticity", (in progress, expected completion June 2020)

MASTERS DISSERTATION SUPERVISION

- Deborah A. Blazo, "Higher order terms in asymptotic elastoplastic mode-III crack tip solutions," (September 1990)

- Juan Pereda, "Finite thermomechanical deformations of anisotropic polymers," (January 1992)

- Amit Srivastava, "Higher order asymptotics of crack tip fields," (December 1993)

- Leonidas Spyrou, "Stress analysis in human foot" (June 2006)

- Dorin–Maria Carka, "Asymptotic analysis of interfacial cracks" (June 2007)

- Evangelia Fragiadaki, "Laser welding of Al 2024. Analysis of temperature fields and residual stress distribution" (February 2010)

- George Tsantidis, "Cracked panel solutions in gradient elasticity" (June 2010)

- Themis Toumanidou, "Taylor Spatial Frame and Ilizarov apparatus: A biomechanical analysis using the finite element method" (March 2011)

- Ioanna Papadioti, "Non-linear homogenization: elastoplastic materials" (October 2013)

- Anastasios Giompliakis, "Three dimensional unit cell modeling of multiphase steels" (February 2014)

POST-DOCTORAL WORK SUPERVISION

- Srivatsa M. Sharma, "Mechanics of interfacial cracks," (September 1991 to June 1993)

- Rajasekeran Govindarajan, "Finite plastic deformation of metal single crystals," (January 1993 to August 1993, with J.L. Bassani.

- Djaffar Boussaa, "Localization of plastic flow in porous media: A linear stability approach," (June 1994 to December 1994)

- Eleni Amanatidou, "Non-local theories of elasticity: Constitutive equations and computational techniques", (October 2001 to December 2003)

- Leonidas Spyrou, "Constitutive modeling of human muscle", (September 2009 to August 2010)

- Ioanna Papadioti, "Computational gradient plasticity", (November 2016 to present)

FORMER PH.D. STUDENTS EMPLOYMENT

Sharma Srivatsa, Principal Software Developer at ANSYS, Inc., Pittsburgh, PA, USA

Govindarajan Sekar, Senior Engineer, MSC Software, Newport Beach, CA, USA

Cheng Cao, General Manager, Radius Product Design, Beijing R&D, China

Ramaswamy Ganesh, Senior Vice President – Global R&D and QA/RA PENTAX Medical, HOYA Corporation, Tokyo, Japan

Bassi Andrea, Senior Engineer, Ingenieurteam Bergmeister GmbH, Vahrn, Italy

Papatriantafillou Yiannis, Senior Engineer, Bic-Violex, Athens

Spyrou Leonidas, Senior Researcher, The Mechatronics Institute, CERETETH

PATENTS

Material Consolidation modeling and control system, United States Patent Number 5,136,497, August 4, 1992.