

Curriculum Vitae of George N. Frantziskonis

George Frantziskonis received his Civil Engineering degree from the Aristotle University, Greece, in 1982 and his doctorate in Engineering Mechanics from the University of Arizona in 1986. He joined the University of Arizona faculty in 1988 after a visiting position at Aristotle University and consulting for the industry. He is a registered professional Civil Engineer in the State of Arizona and in the European Union state members. His teaching interests and activities include contemporary, collaborative, multimedia course delivery methods tailored to classroom-based, distance learning, and classes of large enrollment. He has taught numerous courses in the broad areas of Civil Engineering, Mechanics, and Engineering Design. He has directed graduate students in Civil Engineering, Engineering Mechanics/Materials, and Mechanical, Aerospace Engineering. Frantziskonis's areas of research interests and activities include multi- and interdisciplinary multiscale modeling, simulation, and experimentation, material characterization and applications, probabilistic and multiscale problem formulation and description and applications to safety and reliability, behavior of materials at nano-scale, reaction-diffusion-transport and reactive flow problems. Applications include material characterization and modeling, response of materials to rare stochastic events, and reaction-diffusion-transport phenomena in energy production processes. He has published extensively in journals in the areas of (some journals where his work has been published are shown in parentheses), the diversity coming primarily from extending multiscale methods to several areas of science and engineering:

- Mechanics/Materials (*Int. J. Solids & Structures, Acta Mechanica, Comp. Structures*)
- Physics (*Phys. Rev. B, Phys. Rev. E, J. Phys. A, J. Phys. Cond. Matter*)
- Civil Engineering (*ASCE journals, Comp. & Geotechnics, Structural Control and Health Monitoring*)
- Mechanical Engineering (*Appl. Mech. Rev., J. Comp.-aided Design*)
- Materials Science and Engineering (*Smart Mater. & Struct., J. Intelligent Mat. Systems, Mod. Simul. Mater. Sci. Eng., Comput. Matl. Sci.*)
- Chemical Engineering (*Intl. J. Chem. React. Engr., Ultras. Sonochemistry, Industrial & Engineering Chemistry Research, Chemical Engineering Science*)
- Computational Physics (*J. Comp. Phys., Chaos, Solitons and Fractals*)
- Energy (*Energy Conv. & Management*)

He holds a tenured professor appointment with the Civil Engineering and Engineering Mechanics Department at the University of Arizona, and a courtesy appointment with the Material Science and Engineering Department. He has worked as visiting professor in France, Norway, and Greece, and has taught courses in France and Germany. He has also worked at Department of Defense laboratories for three summers. Awards he has received include the NSF Presidential Young Investigator award and the Fulbright Scholar award.

Knowledge in Diverse Fields

Frantziskonis has been involved in multiscale science and engineering since 1995. Through this he realized early on that different scales involve different disciplines. Thus, his research endeavors strive to relate diverse fields of engineering and science in order to research problems critical to technological advancement. A major part of his work is in stochastic

multiscale problems (in materials and structures) and how stochastic material structure affects the overall material and structural properties and their behavior under extreme conditions.

Narrative Summary of Teaching, Research, Administrative, and Leadership Experience

George Frantziskonis has over 25 years of academic teaching, research, administrative, and leadership experience, and extensive experience working in and collaborating with laboratories and industry, US and international. He has directed numerous theses/dissertations, and has served in over 100 graduate student committees as a member. Through funded research, publications, scholarly presentations, and relevant profession-serving activities he has promoted and extended contemporary branches of Civil, Materials, Mechanical, and Aerospace Engineering. Many of his colleagues have commented on Frantziskonis's acute awareness of the importance of engineering and engineering education in society, and for his vision on the future of research and education.

Administrative Experience: By directing research projects with complex human resource structure extending beyond the single academic unit, and by organizing international conferences and symposia, Frantziskonis has gained significant administrative and managerial experience. For example, a NATO-sponsored workshop that took place in Perm, Russia (see funded research in CV below) was fully organized by Frantziskonis, in managing for professional development, scheduling, disseminating the workshop, in setting up and directing the scientific and organizing committees, and in communicating through secretarial help. As another example, upgrading the Civil Engineering educational laboratories at the University of Arizona involved managing a group involving faculty, technical staff, student representatives, professional fund-raisers, and University administrators. Frantziskonis also has experience in managing teams or individuals under conditions of severe conflict; this was mainly through his extensive involvement in the University of Arizona Committee on Ethics and Commitment and in the Institutional Review Committee. Serving in the High Performance Computing Committee involved the allocation of approximately \$2 million per year of research overhead money to commercial vendors. Finally, serving as member and Co-Chair of the University of Arizona Promotion and Tenure committee, he has provided insight on the operation of a complex organization, such as a university, in areas ranging from engineering and science to humanities, medicine and art.

Leadership Experience: Some of the research efforts Frantziskonis has led demanded visionary leadership and involved complex human, research, and educational interactions. For example, a recent (2004-2009) Department of Energy funded project involved an Assistant Research Professor at the University of Arizona, two Junior and two Senior Researchers at the Oak Ridge National Laboratory, two Senior faculty members at the University of Arizona, a Senior faculty member and a Post-doctoral Fellow at Iowa State University, as well as graduate students at Arizona and Iowa. An outline of goals and objectives – or vision – was set from the beginning and was dynamically improved or adjusted. The program involved continuous assessment of success, and set-up of goals for the short- and long-term future.

(detailed CV follows)

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EDUCATION

Ph.D., Engineering Mechanics, University of Arizona, 1986; B.Sc., Civil Engineering, Aristotle University, Thessaloniki, Greece, 1982

REGISTRATION

State of Arizona, Professional Engineer, License No. 43539
 European Union State Members, Professional Engineer, License No. GR-TEE-38462

EMPLOYMENT

2000 – present, Professor 1994 – 2000, Assoc. Prof. 1988 – 1994, Assist. Prof.	Department of Civil Engineering and Engineering Mechanics, University of Arizona. Dean: Jeff Goldberg (520)621-6594 jgoldberg@arizona.edu Department Head: Kevin Lansey (520)621-2266 lansey@email.arizona.edu
Fall 2015 & Spring 2016 & Spring 2009	Aristotle University, Thessaloniki, Greece
Fall 2001	Visiting Professor, Fulbright Award, Department of Physics, National University of Science and Technology, Trondheim, Norway.
Summer 2001	Professeur Invité, CDGA, Université Bordeaux 1, France.
Summer 1998 & Summer 1997 & Summer 1993	Research Associate, Air Force Office of Scientific Research, Nondestructive Evaluation Branch, Wright Patterson Air Force Base, Ohio.
Oct. 1994 – Apr. 1995	Directeur Recherche Associé au CNRS (Centre National de Recherche Scientifique), Laboratoire de Mécanique et Technologie (LMT), Cachan, France.
Apr. 1994 – Sep. 1994	Professeur Invité, Institute National Polytechnique de Grenoble, Laboratoire 3S, Grenoble, France.
Summer 1991	Visiting Assistant Professor, Petroleum and Geological Engineering, University of Oklahoma, Norman.
1986 – 1988	Visiting Scholar, Institute for Steel Structures, Aristotle University, and Consulting Structural Engineer
1984 – 1986	Research Assistant, College of Engineering, University of Arizona.
1983 – 1984	Teaching Assistant, College of Engineering, University of Arizona.

PRINCIPAL FIELDS OF INTEREST

Multiscale Material and Structural Characterization and Applications	Behavior of Materials at Nano-scale - Surface Effects and Insensitivity to Defects
Stochastic and Multiscale Material Description and Applications to Material and Structural Performance and Reliability	Multiscale Interpretation of Experimental Results
Multiscale and Multiphysics Problems	Scatter in Material Behavior

PUBLICATIONS

Papers in Refereed Journals

1. C. S. Desai, S. Somasundaram & G. Frantziskonis, "A Hierarchical Approach for Constitutive Modeling of (Geo) Materials," *Int. J. Num. & Analytical Meth. in Geom.*, 10, 222-254, 1986.
2. G. Frantziskonis, C. S. Desai & S. Somasundaram, "Constitutive Model for Non-Associative Behavior," *J. of the Engr. Mech. Division, ASCE*, 112, 932-946, 1986.
3. G. Frantziskonis & C. S. Desai "Elastoplastic Model with Damage for Strain Softening Geomaterials," *Acta Mechanica*, 68, 151-170, 1987.
4. G. Frantziskonis & C.S. Desai, "Constitutive Model with Strain Softening," *Int. J. Solids Structures*, 23, 733-750, 1987.
5. G. Frantziskonis & C.S. Desai, "Analysis of Strain Softening Constitutive Law," *Int. J. Solids Structures*, 23, 751-767, 1987.
6. G. Frantziskonis, "Damage and Edge Delamination in Composites," *Solid Mechs. Archives*, 13, 129-146, 1988.
7. G. Frantziskonis, "Distributed Damage in Composites, Theory and Verification," *Composite Struct.*, 10, 165-184, 1988.
8. G. Frantziskonis, "Damage and Free Edge Effects in Laminated Composites. Energy and Stability Propositions," *Acta Mechanica*, 77, 213-230, 1989.
9. G. Frantziskonis & S.P. Joshi, "Damage Evolution and Constitutive Behavior of Advanced Composites," *Composite Struct.*, 16, 341-357, 1990.
10. G. Frantziskonis & C.S. Desai, "Degradation Instabilities in Brittle Material Structures," *Mech. Resear. Commun.*, 17, 135-141, 1990.
11. G. Frantziskonis, F.F. Tang & C.S. Desai, "Borehole Scale Effects and Related Instabilities," *Engr. Fracture Mechs.*, 39, 377-389, 1991.
12. G. Frantziskonis & C.S. Desai, "Surface Degradation Mechanisms in Brittle Material Structural Systems," *Int. J. Fracture*, 48, 231-244, 1991.
13. S.P. Joshi & G. Frantziskonis, "Damage Evolution in Laminated Advanced Composites," *Composite Struct.*, 17, 127-139, 1991.
14. G. Frantziskonis, "Surface Effects In Brittle Materials and Internal Length Estimation," *Appl. Mech. Rev.*, 45, 3 (p2), S62-S70, 1992.

15. F.F. Tang, C.S. Desai & G. Frantziskonis, "Heterogeneity and Degradation in Brittle Materials," *Engr. Fracture Mechs.*, 43, 779-796, 1992.
16. G. Frantziskonis, C.S. Desai, F.F. Tang & D. Daniewicz, "Degradation Mechanisms in Brittle Materials Investigated by Ultrasonic Scanning," *Engr. Fracture Mechs.*, 42, 347-369, 1992.
17. D. Daniewicz & G. Frantziskonis, "On Edge Delamination in Laminated Composites," *Composite Struct.*, 21, 141-153, 1992.
18. I. Vardoulakis & G. Frantziskonis, "Micro-Structure in Kinematic-Hardening Plasticity," *Europ. J. Mechs. A/Solids*, 11, 467-486, 1992.
19. G. Frantziskonis & I. Vardoulakis, "On the Micro-Structure of Surface Effects and Related Instabilities," *Europ. J. Mechs. A/Solids*, 11, 21-34, 1992.
20. G. Frantziskonis, "On the Equivalence of Isotropic Damage Mechanics and Plasticity," *Int. J. Plasticity*, 10, 303-308, 1994.
21. G. Frantziskonis, P. Karpur, T. Matikas, S. Krishamurthy & P. Jero, "Fiber Matrix Interface - Information from Experiments via Simulation," *Composite Struct.*, 29, 231-247, 1994.
22. G. Frantziskonis, "On the Possibly Multifractal Properties of Dissipated Energy in Brittle Materials," *Appl. Mech. Rev.*, 47, 1(p2), S132-S140, 1994.
23. G. Frantziskonis, "On Scaling Phenomena in Fracture of Heterogeneous Solids," *Europ. J. Mechs. A/Solids*, 13, 73-92, 1994.
24. H. Dai & G. Frantziskonis, "Heterogeneity, Spatial Correlations, Size Effects and Dissipated Energy in Brittle Materials," *Mechanics of Materials*, 18, 103-118, 1994.
25. G. Frantziskonis & B. Loret, "Scale Dependent Constitutive Relations - Information from Wavelet Analysis and Application to Localization Problems," *Eur. J. Mechs. A/Solids*, 14, 873-892, 1995.
26. G. Hong, A. Yalozis & G. Frantziskonis, "Hygrothermal Degradation in Glass-Epoxy - Evaluation through Stress Wave Factors," *Composite Struct.*, 30, 407-418, 1995.
27. G. Frantziskonis, "Heterogeneity and Implicated Surface Effects - Statistical, Fractal Formulation and Relevant Analytical Solution," *Acta Mechanica*, 108, 157-178, 1995.
28. G. Frantziskonis, Discussion of "Stochastic Approaches for Damage Evolution in Standard and Non-standard Continua," *Int. J. Solids Structures*, 33, 2261-2265, 1996.
29. M. J. Meisner & G. Frantziskonis, "Dissipated Energy as a Function of Material Microstructure: Towards Optimum Fracture-toughness," *J. Mech. Beh. of Matls.*, 6, 285-300, 1996.
30. M. J. Meisner & G. Frantziskonis, "Multifractal Fracture-toughness Properties of Brittle Materials," *J. Physics A*, 29, 2657-2670, 1996.
31. M. J. Meisner & G. Frantziskonis, "Heterogeneous Materials - Scaling Phenomena Relevant to Fracture and to Fracture Toughness" *Chaos, Solitons & Fractals*, 8, 151-170, 1997.
32. P. Renaudin, D. Breyse & G. Frantziskonis, "Heterogeneous Solids: Part II - Numerical Results on 2-D Boundary Effects and Related Problems," *Eur. J. Mechs. A/Solids*, 16, 453-470, 1997.

33. G. Frantziskonis, P. Renaudin & D. Breyse, "Heterogeneous Solids: Part I - Analytical and Numerical 1-D Results on Boundary Effects," *Eur. J. Mech. A/Solids*, 16, 423-452, 1997.
34. G. Frantziskonis, "Stochastic Modeling of Heterogeneous Materials - A Process for the Analysis and Evaluation of Alternative Formulations," *Mechanics of Materials*, 27, 165-175, 1998.
35. J.O. Vasseur, P.A. Deymier, G. Frantziskonis, G. Hong, B. Djafari-Rouhani & L. Dobrzynski, "Experimental evidences for the existence of absolute acoustic band gaps in two-dimensional periodic composite media," *J. of Physics: Condensed Matter*, 10, 6051-6064, 1998.
36. M. Budhu, S. Ramakrishnan & G. Frantziskonis, "A Lattice-type Model for the Behavior of Particulate Media," *Int. J. Num. & Anal. Meth. in Geom.*, 23, 647-671, 1999.
37. G. Frantziskonis & A. Hansen, "Wavelet-based Multiscaling in Self-affine Random Media," *Fractals*, 8, 403-411, 2000.
38. G. Frantziskonis, P.A. Deymier, "Wavelet Methods for Analyzing and Bridging Simulations at Complementary Scales – the Compound Wavelet Matrix and Application to Microstructure Evolution," *Modelling Simul. Mater. Sci. Eng.*, 8, 649-664, 2000.
39. G. Frantziskonis, L.B. Simon, J. Woo & T.E. Matikas, "Multiscale Characterization of Pitting Corrosion and Application to an Aluminum Alloy," *Eur. J. Mechanics, A/Solids*, 19, 309-318, 2000.
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44. G. Frantziskonis, "Wavelet-based Multiscaling - Application to Material Porosity and Identification of Dominant Scales," *Prob. Engr. Mechanics*, 17, 349-357, 2002.
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47. G. Frantziskonis & A. Denis, "Complementarity Entropy and Wavelet Analysis of Drilling-Ability Data," *Mathematical Geol.*, 35, 89-103, 2003.
48. G. Frantziskonis & D. Breyse, "Influence of Soil Variability on Differential Settlements of Structures," *Comp. and Geotechnics*, 30, 217-230, 2003.

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50. P.A. Deymier, Kidong Oh, K. Muralidharan, G. Frantziskonis and K. Runge, "Selection of Domains for Coarse and Fine Levels of Description in Mixed-Potential Simulations," *Journal of Computer-Aided Materials Design (JCAD)*, 13, 17-44, 2006.
51. G. Frantziskonis & P. Deymier, "Surface Effects at Nanoscale Significantly Reduce the Effects of Stress Concentrators," *Prob. Engr. Mechs.*, 21, 277-286, 2006.
52. G. Frantziskonis & P. Deymier, "The Effects of Stress Concentrators on Strength of Materials at Nano Scale – A Molecular Dynamics Study," *Mech. Res. Comm.*, 33, 352-358, 2006.
53. S.K. Mishra, K. Muralidharan, S. Pannala, S. Simunovic, P. Deymier & G. Frantziskonis, "Wavelet-based Spatial Scaling of Coupled Reaction-diffusion Fields," *Int. J. Mult. Comp. Eng.*, 6, 281-297, 2008.
54. K. Muralidharan, S.K. Mishra, G. Frantziskonis, P.A. Deymier, P. Nukala, S. Simunovic, S. Pannala, "The Dynamic Compound Wavelet Matrix Method for Multiphysics/multiscale Problems," *Phys. Rev. E*, 77, 026714, 2008.
55. S.K. Mishra, K. Muralidharan, S. Pannala, S. Simunovic, C.S. Daw, P. Nukala, R.O. Fox, P.A. Deymier, G. Frantziskonis, "Spatiotemporal Compound Wavelet Matrix Framework for Multiscale/Multiphysics Reactor Simulation: Case Study of a Heterogeneous Reaction/Diffusion System," *Intl. J. Chem. React. Engr.*, 6, A28, 2008.
56. G. Frantziskonis & T.E. Matikas, "Multiscale Wavelet-based Analysis and Characterization of Fretting Fatigue Damage in Titanium Alloys," *Mater. Transactions*, 50, 1758-1767, 2009.
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59. S.K. Mishra, P. Deymier, K. Muralidharan, G. Frantziskonis, S. Pannala, S. Simunovic, "Modeling the Coupling of Reaction Kinetics and Hydrodynamics in a Collapsing Cavity," *Ultrason. Sonochem.* 17, 258-265, 2010.
60. G. Frantziskonis, "Lattice Boltzmann Method for Multimode Wave Propagation in Viscoelastic Media and in Elastic Solids," *Phys. Rev. E*, 83, 066703, 2011.
61. G. Frantziskonis, "Temporal Scaling in Fatigue Life of Materials and Incorporation of Temporal Events in Paris's Law," *J. Mech. Behavior of Materials*, 21, 175-180, 2013.
62. G. Frantziskonis, "Multiscale Unified Prediction of Size/scale and Hall-Petch Effects in Mechanics of Polycrystalline Materials," *J. Mech. Behavior of Materials*, 22, 67-71, 2013.
63. J.J. Proczka, K. Muralidharan, D. Vilela, J. Simmons, and G. Frantziskonis, "Guidelines for the Efficient Sizing of Pressure Vessels for Compressed Air Energy Storage," *Energy Conversion and Management*, 65, 597-605, 2013.
64. D.M. Buban and G. Frantziskonis, "Shape Memory Alloy Fracture as a Deployment Actuator," *Smart Mater. Struct.* 22, 115034 (10pp), 2013.

65. G. Frantziskonis, "On the Strength Reliability of Statistically Heterogeneous Materials with Microstructure at Diverse Scales," *Int. J. Mult. Comp. Eng.*, 12, 249-255, 2014.
66. Sourav Gur, Sudib K. Mishra and George N. Frantziskonis, "Thermomechanical strain rate dependent behavior of SMAs as vibration dampers and comparison to conventional dampers," *Journal of Intelligent Material Systems and Structures*, DOI: 10.1177/1045389X15588628, 2015.
67. Sourav Gur, Thomas Danielson, Celine Hin, Sreekanth Pannala, George Frantziskonis, Aditya Savara, Stuart Daw, "Wavelet-based surrogate time series for multiscale simulation of heterogeneous catalysis," *Chemical Engineering Science*, 144, 165-175, 2016. doi:10.1016/j.ces.2016.01.037
68. Avraam A. Konstantinidis, George Frantziskonis, Harm Askes and Elias C. Aifantis, "The use of nanoindentation for determining internal lengths and the constitutive response of monument materials: models and experiments," *Journal of the Mechanical Behavior of Materials*, 25, 57-60, ISSN (Online) 2191-0243, ISSN (Print) 0334-8938, DOI: 10.1515/jmbm-2016-0003, April 2016.
69. Sourav Gur and George N. Frantziskonis, "Linking simulations and experiments for the multiscale tracking of thermally induced martensitic phase transformation in NiTi SMA," *Modelling Simul. Mater. Sci. Eng.*, 24 (2016) 075006 (26pp), doi:10.1088/0965-0393/24/7/075006.
70. Sourav Gur and George N. Frantziskonis, "Atomistic study on size effects in thermally induced martensitic phase transformation of NiTi," *Smart Materials Research*, Volume 2016, Article ID 7512642, 12 pages, <http://dx.doi.org/10.1155/2016/7512642>.
71. Sourav Gur and George N. Frantziskonis, "Thermally Modulated Superelastic SMA Dampers for Vibration Control," Athens: ATINER'S Conference Paper Series, No: CIV2016-2124, 2016.
72. Frantziskonis, George and Gur, Sourav, "Computational simulations for the development of novel solid-state smart NiTi-Al thermal diodes," *Journal of Intelligent Material Systems and Structures*, DOI: 10.1177/1045389X16685440, 2017 (13 pp plus supplement).
73. Sourav Gur, Venkateswara Rao Manga, Stefan Bringuier, Krishna Muralidharan and George N. Frantziskonis, "Evolution of internal strain in austenite phase during thermally induced martensitic phase transformation in NiTi shape memory alloys," *Comput. Matl. Sci.*, <http://dx.doi.org/10.1016/j.commatsci.2017.03.012>, 133, 52-59, 2017.
74. Frantziskonis, George and Gur, Sourav, "Length scale effects and multiscale modeling of thermally induced phase transformation kinetics in NiTi SMA thin films," *Modelling Simul. Mater. Sci. Eng.*, 25 (2017) 045002 (29pp) <https://doi.org/10.1088/1361-651X/aa6662>
75. Sourav Gur, George Frantziskonis, Sreekanth Pannala and Stuart Daw, "Application of Wavelet-Based Methods for Accelerating Multi-Time-Scale Simulation of Bistable Heterogeneous Catalysis," *Industrial & Engineering Chemistry Research*, ACS, DOI: 10.1021/acs.iecr.6b04407, 2017 (14 pp plus supplement).
76. Sourav Gur, George N. Frantziskonis, and Sudib K. Mishra, "Thermally modulated shape memory alloy friction pendulum (tmSMA-FP) for substantial near-fault earthquake structure protection," *Structural Control and Health Monitoring*, 2017;e2021, DOI: 10.1002/stc.2021 (15 pp plus supplement).

Books Chapters/Special Contributions to Books

- B1. G. Frantziskonis, "Heterogeneity and Its Implications - Micromechanical, Statistical, Fractal Approach and their Similarity," In *Damage in Composite Materials*, G. Voyiadgis Editor, Elsevier, New York, 1993.
- B2. G. Frantziskonis, "Crack Pattern Related Universal Constants," In *Probabilities and Materials*, NATO-ASI Series, D. Breyse Editor, Kluwer Academic Publishers, Dordrecht, The Netherlands, 1994.
- B3. G. Frantziskonis & M.P. Blodgett, "Multiscale Material Characterization and Applications," In *Probabilities and Materials - Tests, Models and Applications for the 21st Century*, G. Frantziskonis (editor), Kluwer Academic Press, (NATO-ASI), Dordrecht, 1998.
- B4. S. Pannala, S. Simunovic, and G. Frantziskonis, "Multiscale/Multiphysics Modeling of Biomass Thermochemical Processes," In *Computational Modeling in Lignocellulosic Biofuel Production*, M. Crowley and M. Nimlos (editors), ACS publishers, pp 245-272, 2010.

Books - Edited

- B5. *Constitutive Laws for Engineering Materials*, C.S. Desai, E. Krempl, G. Frantziskonis & H. Saadatmanesh (editors), ASME Press, New York, 1991.
- B6. *Probabilities and Materials - Tests, Models and Applications for the 21st Century*, G. Frantziskonis (editor), Kluwer Academic Press, (NATO-ASI), Dordrecht, 1998.

Books – Electronic, Textbooks

- B7. Frantziskonis, G. *Mechanics of Materials*, a one-unit fully web-based engineering science course, offered at the University of Arizona as Engineering 211E, 2000.
- B8. Frantziskonis, G., *Essentials of Mechanics of Materials*, DESTech Publications, Lancaster Pennsylvania, first edition 2010, second edition 2013.

Conference Proceedings

- C1. C.S. Desai, G. Frantziskonis & S. Somasundaram, "Constitutive Modeling for Geological Materials," Proc. 5th Int. Conf. Num. Methods in Geomechanics, Nagoya, Japan, A.A. Balkema/Rotterdam, 1985, T. Kawamoto & Y. Ichikawa, Eds., pp. 18-34.
- C2. G. Frantziskonis & S.P. Joshi, "Damage Evolution and Constitutive Behavior of Advanced Composites," Proc. 4th Technical Conf., Amer. Society for Composites," Virginia, Technomic Publ., 1989, K.M. Finlayson, Ed., pp. 85-96.
- C3. S.P. Joshi & G. Frantziskonis, "Damage Evolution in Laminated Advanced Composites," Proc. 4th Technical Conf., Amer., Society for Composites," Virginia, Technomic Publ., 1989, K.M. Finlayson, Ed., pp. 97-106.
- C4. G. Frantziskonis, "Surface Degradation Mechanisms in Brittle Material Structural Systems," Proc. Intl. Conf. on Mechanics, Physics and Structure of Materials, August 19-24 1990, E.C. Aifantis, Ed., Thessaloniki, Greece, 1990, pp. 139-140.

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- C6. G. Frantziskonis, "Degradation Instabilities in Brittle Material Structures," *Proc. 7th Intl. Conf. on Comp. Meth. Adv. Geom.*, Cairns, Australia, May 6-10, 1991, G. Beer et al., Eds., pp. 617-624.
- C7. G. Frantziskonis, F.F. Tang & C.S. Desai, "Borehole Scale Effects and Related Instabilities," *Proc. 3rd Intl. Conf. Constit. Laws Engr. Matls*, ASME Press, Tucson, Arizona, 1991, C.S. Desai et al., Eds., pp. 407-411.
- C8. X. Yuan, F.F. Tang & G. Frantziskonis, "Random Initial Heterogeneity and Degradation in Brittle Materials," *Proc. ASCE specialty conf., 9th Engr. Mech. conf.*, May 7-12, 1992, Texas A&M University, College station Texas, L.D. Lutes & J.M. Niedzwecki, Eds., pp. 616-619.
- C9. G. Frantziskonis, "Heterogeneity, Microstructural Surface Effects and Internal Length Estimation," *Proc. ASME summer meeting*, Phoenix, Arizona, April 28-May 1, 1992, H.M. Zbib, Ed., pp. 51-66.
- C10. G. Frantziskonis, "Heterogeneity in Brittle Materials: Statistical Approach and Relation to Fracture," *Proc. Intl. Symp. of Hard Soils, Soft Rocks*, Athens, Greece Sept. 20-23, 1993, Balkema, Rotterdam, A.Anagnostopoulos et al., Eds., pp. 1601-1608.
- C11. G. Frantziskonis, "On the Relation Between Fracture Surface Characteristics and Material Properties," *Proc. IUTAM symposium on Size-scale Effects in the Failure Mechanisms of Materials and Structures*, Torino, Italy, October 3-7, 1994, A. Carpinteri, Ed., pp.135-146.
- C12. G. Frantziskonis, T.E. Matikas, P. Karpur, & S. Krishnamurthy, "Simulation of Fiber-matrix Interface Behavior Under Various Experimental Configurations," *Proc. Int. Conf. Composites Engr.*, (ICCE/1), New Orleans, August 28-31, 1994, D. Hui, Ed., pp. 147-148.
- C13. M. Budhu, S. Ramakrishnan & G. Frantziskonis, "Mechanics of Particulate Media - A Lattice Type Approach," *Proc. Workshop Mechs. and Statistical Phys. of Particulate Media*, Institute for Mechanics and Materials, Univ. Calif. San Diego, June 8-10, 1994, pp. 33-36.
- C14. M. Budhu, S. Ramakrishnan, & G. Frantziskonis, "Micro-structure in Particulate Media - A Lattice Type Approach and its Validation," *Proc. Particulate Mechs. Meeting*, Air Force Office of Scientific Research, Wright Laboratory, Tyndall AFB, Panama City, Florida, Sept. 22-23, 1995, pp. 315-319.
- C15. G. Frantziskonis, T.E. Matikas, P. Karpur, S. Krishnamurthy & L. Shaw "Lattice Analysis to Assess Fiber-Matrix Interface Behavior under Various Experimental Configurations," *Proc. Int. Conf. Computational Engr. Sci.*, Hawaii, July 30-August 3, 1995, S.N. Atluri et al., Eds., pp. 2563-2568.
- C16. G. Frantziskonis, "Surface Effects: Relevant Length Scales and Instabilities," *Actes du 8ème Colloque National MECAMAT, Mécanismes et Mécanique des Surfaces, Interfaces and Interphases*, 16-19 Janvier 1995, Aussois, France, A. Benallal, Ed., pp. 64-67.
- C17. S. Ramakrishnan, M. Budhu & G. Frantziskonis, "Constitutive Behavior of Granular Media Using a Lattice Type Model," *Proc. 11th ASCE Engr. Mechanics Conf.*, Ft. Lauderdale, Florida, May 19-22, 1996, Y.K. Lin and T.C. Su, Eds., pp. 713-716.

- C18. M.J. Meisner & G. Frantziskonis, "Dissipated Energy as a Function of Material Microstructure," Proc. 11th ASCE Engr. Mechanics Conf., Ft. Lauderdale, Florida, May 19-22, 1996, Y.K. Lin and T.C. Su, Eds., pp. 1030-1033.
- C19. S. Ramakrishnan, M. Budhu & G. Frantziskonis, "Deformation and Failure of Granular Media - A Lattice Type Model," Proc. First Int. Forum on Discontinuous Deformation Analysis (DDA), Berkeley, California, June 12-14, 1996, M.R. Salami and D. Banks, Eds., pp. 19-26.
- C20. G.N. Frantziskonis, L.B. Simon, J. Woo, & T.E. Matikas, "Characterization of Pitting Corrosion Damage with Wavelet and Fractal Analysis," NDE-MURI, 2nd Annual Review, Dayton, Ohio, September 16, 1998, T.E. Matikas, Ed., pp. A22-1 to A22-13.
- C21. G.N. Frantziskonis, E. Shell, J. Woo, & T.E. Matikas, "Analysis of Fretting Experimental Data with Wavelet Analysis," NDE-MURI, 2nd Annual Review, Dayton, Ohio, September 16, 1998, T.E. Matikas, Ed., pp. A16-1 to A16-15.
- C22. S. Gustafson, J.R. Metha & G.N. Frantziskonis, "Practical Optical Characterization of Fretted Surfaces," Proc. 2nd Int. Symposium on Fretting Fatigue, Salt lake City, Utah, Aug. 30 - Sept. 3, 1998, R.L. Crane, Ed., 5 pages.
- C23. A. Konstantinidis, G. Frantziskonis & E.C. Aifantis, "Wavelets Approach to Adiabatic Shear Banding," Proc. 5th National Congress on Mechanics, vol. 2, Ioannina, 27-30 August, 1998, pp. 930-936.
- C24. G.N. Frantziskonis, L.B. Simon, J. Woo, & T.E. Matikas, "Characterization of Pitting Corrosion Damage through Multiscale Analysis," Proc. of SPIE, Nondestructive Evaluation of Aging Materials and Composites, Newport Beach, California, March 3-5, 1999, G.Y. Baaklini et al., Eds., pp. 48-58.
- C25. G.N. Frantziskonis, E. Shell, J. Woo, & T.E. Matikas, "Wavelet Analysis of Fretting Experimental Data," Proc. of SPIE, Nondestructive Evaluation of Aging Materials and Composites, Newport Beach, California, March 3-5, 1999, G.Y. Baaklini et al., Eds., pp.11-22.
- C26. G. Frantziskonis & P.A. Deymier, "Compound Wavelet Matrix for Bridging Simulations at Complementary Scales - Application to Microstructure Evolution," Proc. 14th Engineering Mechanics Conference, ASCE, Austin, Texas, May 21-24, 2000, J.L. Tassoulas, Ed. of CD proceedings.
- C27. G. Frantziskonis, "Multiscale Material Heterogeneity – Wavelet-based Identification of Dominant Scales and Implications to Properties," Proc. 8th ASCE Conference on Probabilistic Mechanics and Structural Reliability, Notre Dame, Indiana, July 24-26, 2000, A. Haldar, Ed.
- C28. G. Frantziskonis, "Characterization of Materials with Pores and Inclusions at Diverse Scales," Proc. 6th National Congress on Mechanics, Thessaloniki Greece, July 19-21, 2001, E.C. Aifantis & A.N. Kounadis, Eds., Vol. II, pp. 359-364.
- C29. G. Frantziskonis, "Characterization of Materials with Pores and Inclusions at Diverse Scales," Proc. ICOSSAR 2005, 9th International Conference on Structural Safety and Reliability, Newport Beach, California, June 17-21, 2001, R. Cororis et al, Ed., pp 1-8.
- C30. C. Haymie & G. Frantziskonis, "Multiscale Material Characterization and Application to Artificially Created Microstructures," Proc. 10th IACMAG, Tucson, Arizona, 7-12 January 2001, C.S. Desai et al., Eds., Balkema, Rotterdam, pp. 529-532.

- C31. S. Chen & G. Frantziskonis, "Wavelet Analysis and Synthesis of Statistical Multiscale Material Heterogeneity," Proc. ICOSSAR 2005, 9th International Conference on Structural Safety and Reliability, Rome, Italy, June 19-23, 2005.
- C32. G. Frantziskonis & P. Deymier, "Surface Effects at Nanoscale Eliminate the Adverse Effects of Stress Concentrators," Proc. McMat 2005, Mechanics and Materials Conference, Baton Rouge, Louisiana, June 1-3, 2005, G. Voyiadjis, Ed., pp. 704-706.
- C33. G. Frantziskonis, K. Muralidharan, Pierre Deymier, Srdjan Simunovic and Sreekanth Pannala, "Parallel-in-Time Multiscale/Multiphysics Framework," Proc. 3rd International Conference "From Scientific Computing to Computational Engineering, 3rd IC-SCCE, Athens, 9-12 July, 2008, D. Tsahalis, Ed., pp. 1-6.
- C34. S. K. Mishra, K. Muralidharan, P. Deymier, G. Frantziskonis, S. Simunovic, and S. Pannala, "Wavelet Based Spatial Scaling of Coupled Reaction Diffusion Fields," Proc. 8th International Conference in Computational Science ICCS 2008, Kraków, Poland, June 23-25, 2008, Part II, LNCS 5102, pp. 301-310, 2008. M. Bubak et al. (Eds.), Springer-Verlag Berlin Heidelberg.
- C35. Dominique Vilella, Scott De Valle, Mark Alvarez, Krishna Muralidharan, Pierre Deymier, George Frantziskonis, Compressed-Air Energy Storage Systems for Stand-Alone Off-Grid Photovoltaic Modules, IEEE, 35th Photovoltaic Specialists Conference, Summer 2010 proceedings.
- C36. Sourav Gur, Venkateswara Rao Manga, Stefan Bringuier, Krishna Muralidharan, Frantziskonis George, Anisotropy in the Transformation Dynamics of Austenite (B2) to Martensite (B19') Associated with Superelasticity in NiTi, 2015 TMS Annual Meeting & Exhibition, March 15-19, Orlando, FL, 2015.
- C37. Sourav Gur, Venkateswara Rao Manga, Stefan Bringuier, Krishna Muralidharan and George N. Frantziskonis, "The role of internal strain in the austenite phase stabilization during the martensitic phase transformation in NiTi shape memory alloys," MRS Spring meeting and exhibit, March 28-April 1, 2016, Phoenix, Arizona, 2016.

FUNDED RESEARCH/GRANTS - I am single P.I. unless all investigators noted

- INSTABILITIES OF DAMAGE AND SURFACE DEGRADATION MECHANISMS IN BRITTLE MATERIAL STRUCTURAL SYSTEMS
Sponsor: Air Force Office of Scientific Research, Bolling AFB, Washington, DC
Period: August 1, 1989 – July 31, 1991
Award: \$143,047.00
PI: G. Frantziskonis [70%], Co-Investigator: C.S. Desai
- LIQUEFACTION OF EXTRATERRESTRIAL SOILS SUCH AS LUNAR SIMULANTS
Sponsor: NASA-SERC
Period: 1989-1990
Award: \$54,000.00
PI: C.S. Desai, Co-Investigators: H. Saadatmanesh and G. Frantziskonis [20%]
- SURFACE EFFECTS ON MECHANICAL PROPERTIES OF MATERIALS. PRESIDENTIAL YOUNG INVESTIGATOR (PYI) AWARD
Sponsor: National Science Foundation
Period: June 1, 1991 – May 31, 1996

Award: \$125,000.00

This was a five-year award. The NSF provided \$25,000.00 per year plus matching funds shown in the following as NSF/PYI)

- MECHANICS OF RESERVOIR POROUS ROCKS
Sponsor: NSF/PYI (50%) and Oklahoma Consortium for Rock Mechanics (50%)
Period: July 1, 1991 – December 31, 1991
Award: \$9,520.00
- SYMBOLIC COMPUTATIONS BY COMPUTER USING *MATHEMATICA*
Sponsor: NSF/PYI (50%) and Wolfram Research Inc., Champaign, Illinois (50%)
Period: March 1992
Award: \$2,792.00
- SUPPORT OF WORK ON ADVANCED COMPOSITE MATERIALS
Sponsor: NSF/PYI (50%) and Sigma Labs, Inc., Tucson, Arizona (50%, through Intergraph WorkStation Computer Equipment Donation)
Period: March 1992
Award: \$36,500.00
- DAMAGE DETECTION IN BIOLOGICAL COMPOSITES
Sponsor: NSF/PYI (50%) and Cyprus Neuroscience and Technology Institute (50%)
Period: January 1, 1993 – December 31, 1993
Award: \$30,000.00
- EQUIPMENT DEVELOPMENT FOR NONDESTRUCTIVE TESTING
Sponsor: NSF/PYI (50%) and Tektronix Corporation (50%, Tektronix provided new equipment of my choice worth \$25K)
Period: August 1992
Award: \$50,000.00
- RESEARCH AND DEVELOPMENT IN ADVANCED MATERIALS
Sponsor: NSF/PYI (50%) and Hughes Aircraft Corporation (50%)
Period: March 1993 – May 1996
Award: \$75,000.00
- SALARY COMPLEMENT FOR VISITING PROFESSORSHIP
Sponsor: University of Grenoble, France (50%), Centre National de Recherche Scientifique, France) (50%)
Period: 1994-1995 (12 months, during sabbatical leave)
Award: \$48,000
- LATTICE TYPE APPROACH FOR THE MICRO-MECHANICAL RESPONSE OF GRANULAR ASSEMBLIES
Sponsor: National Science Foundation
Period: 1993-1994
Award \$45,633.00
Co-PIs: M. Budhu and G. Frantziskonis [50%]
- MICRO-STRUCTURE IN PARTICULATE MEDIA - A LATTICE TYPE APPROACH AND ITS VALIDATION
Sponsor: Air Force Office of Scientific Research, Bolling AFB, Washington, DC
Period: 1993-1995

Award: \$114,414.00

PI: M. Budhu, Co-PI: G. Frantziskonis [40%]

- MATERIALS PROPERTIES - INFORMATION FROM NONDESTRUCTIVE AND DESTRUCTIVE EXPERIMENTS VIA SIMULATION
Sponsor: Department of the Air Force, Wright Laboratory (AFMC), Wright-Patterson Air Force Base, Ohio
Period: January 1, 1995 – December 31, 1995
Award: \$25,000.00
- MECHANICS OF FAILURE OF METAL MATRIX COMPOSITES
Sponsor: National Science Foundation - Division of International Programs
Period: 1995-1996
Award: \$39,288.00
PI: M.J. Meisner, co-PI: G. Frantziskonis [30%]
- PROBAMAT 21st CENTURY: Probabilities and Materials, Tests, Models and Applications for the 21st Century," NATO ARW (Advanced Research Workshop)
Sponsor: NATO
Period: February 1997 – October 1997
Award: \$25,000
- WAVELET ANALYSES OF TITANIUM MICROSTRUCTURES
Sponsor: Wright-Patterson AFB (Through an on-site contract to UDRI (Univ. Dayton Research Institute))
Period: January 1, 1998 – December 31, 1998
Award: \$25,000.00
- EVALUATION OF MICROSTRUCTURES WITH WAVELET ANALYSIS AND APPLICATION TO AN ALUMINUM ALLOY
Sponsor: National Science Foundation
Period: August 1, 1998 – July 31, 2002
Award: \$239,926.00.
- SALARY COMPLEMENT FOR VISITING PROFESSORSHIP
Sponsor: The J. William Fulbright Scholarship Board and U.S. Department of State
Period: August 2001-January 2002 (6 months, during sabbatical leave)
Award: \$25,000
- WEARABLE MICRO-MECHANICAL SCANNER DURING DIGITAL RECTAL EXAMINATION (DRE) FOR THE EARLY DETECTION AND DIAGNOSIS OF PROSTATE CANCER
Sponsor: Institutional Cancer Research Center, University of Arizona
Period: January 1, 2005 – December 31, 2005
Award: \$20,000
PI: S. Ramakumar, MD, co-PIs: E. Enikov & G. Frantziskonis
- MICRO-MESOSCOPIC MODELING OF HETEROGENEOUS CHEMICALLY REACTING FLOW (MMM-HCRF) OVER CATALYTIC/SOLID SURFACES
Sponsor: DoE: sub-contract from Oak Ridge National Laboratory
Period: October 7, 2005 – Aug. 31, 2009
Award: \$332,802
PI: G. Frantziskonis, co-PI: P. Deymier

- COMPRESSED-AIR ENERGY STORAGE SYSTEMS FOR STAND-ALONE OFF-GRID PHOTOVOLTAIC MODULES
Sponsor: Arizona Research Institute on Solar Energy
Period: September 1, 2008 – Aug. 31, 2009
Award: \$40,000
PI: K. Muralidharan, , co-PIs: P. Deymier, G. Frantziskonis
- SYSTEM DESIGN OF SCALABLE COMPRESSED-AIR ENERGY STORAGE SYSTEMS FOR SOLAR-POWERED ENERGY PLANTS
Sponsor: Arizona Research Institute on Solar Energy
Period: January 1, 2010 – Dec. 31, 2010
Award: \$40,000
PI: K. Muralidharan, co-PI: G. Frantziskonis
- NEW GK-12 WATER AND ENERGY SYSTEMS: THE KEY TO THE FUTURE OF ARID AND SEMI-ARID REGIONS
Sponsor: National Science Foundation
Period: February 1, 2010 – Jan. 31, 2015
Award: \$2,881,937
PI: K. Ogden, five co-PIs, including G. Frantziskonis
- MULTISCALE COMPUTATIONAL MODELING OF HETEROGENEOUS CATALYSIS VIA WAVELET-BASED INFORMATION TRANSFER ACROSS SCALES
Sponsor: UT-Battelle – Oak Ridge National Laboratory
Period: February 5, 2016 – September 30, 2017
Award: \$32,607
PI: G. Frantziskonis

TEACHING GRANTS

These are listed in the teaching section of the CV.

PROFESSIONAL ACTIVITIES, RECOGNITIONS AND AWARDS

Review Duties

- International Journal for Numerical and Analytical Methods in Geomechanics
- Mechanics of Materials
- National Science Foundation (individual proposals and panel reviews)
- Applied Mechanics Reviews
- Journal of the Engineering Mechanics Division, ASCE
- Acta Mechanica
- International Journal of Solids and Structures
- AIAA Journal, American Institute of Aeronautics and Astronautics
- Reviewer of proposals for new journals, Kluwer Academic Publishers
- Journal of the American Ceramic Society
- Composites Science and Technology
- Engineering Fracture Mechanics
- Journal of Applied Mechanics, ASME
- Probabilistic Engineering Mechanics

- Geophysical Research Letters
- Computers and Structures
- Computer Methods in Applied Mechanics and Engineering
- Journal of Pressure Vessel Technology, ASME
- Ministero dell'Istruzione, dell'Università e della Ricerca (MURST), Progetti di Ricerca di Interesse Nazionale (PRIN), (Italian Ministry for Universities and Research)
- Υπουργείο Εθνικής Παιδείας και Θρησκευμάτων (ΥΕΠΘ), Προτάσεις Προγραμμάτων Μεταπτυχιακών Σπουδών (ΕΠΑΕΚ), (Greek Ministry for Education and Religious Affairs)
- Scientia Iranica
- Water Resources Research
- Exact Sciences and Technology, Israel Science Foundation
- Wave Motion
- U.S. Army Corps of Engineers, Engineering Research and Development Center
- Austrian Funds of Science, Natural and Technical Sciences
- Journal of Mechanics of Materials and Structures
- Mechanics Research Communications
- Canadian Geotechnical Journal
- Canada Foundation for Innovation
- Structural Health Monitoring
- Computer Physics Communications
- Construction & Building Materials
- Applied Mathematical Modelling
- Entropy
- European Commission, HORIZON 2020 FET-OPEN - NOVEL IDEAS FOR RADICALLY NEW TECHNOLOGIES, large scale proposals
- Engineering Applications of Artificial Intelligence
- Computers and Geotechnics
- Journal of Intelligent Material Systems and Structures
- International Journal of Damage Mechanics
- IIE Transactions

Invited Departmental Lectures

University of Minnesota, Department of Civil and Mineral Engineering. "Instabilities of Damage and Surface degradation in Brittle Material Structures," May 19, 1989. Invited by Professors I. Vardoulakis and T. Galambos.

University of California, San Diego, Department of Applied Mechanics and Engineering Science. "On Scaling Phenomena in Fracture of Heterogeneous Media, February 8, 1993. Invited by Professor H. Murakami.

Institute de Mecanique de Grenoble, France. "Damage Mechanics, Basic Concepts and Applications," June 2, 1994, "Theory of Plasticity and Relation to Damage Mechanics," June 9, 1994, Numerical Methods, FEM, Lattices, Applications," June 16, 1994, "Fractals, Scaling and Mechanical Behavior of Materials," June 23, 1994, "Some Recent Advances in Fracture and Relevant Topics," June 30, 1994. Invited by Professor F. Darve.

École Polytechnique Fédérale de Lausanne, Les Laboratoires de Mécanique des Sols et des Roches. "Recent Advances in Fracture of Heterogeneous Solids," July 4, 1994. Invited by Professor L. Vulliet.

National Technical Norwegian University, Trondheim, Norway, Department of Theoretical Physics. "Scaling Phenomena in Fracture of Heterogeneous Media," October 13, 1994. Invited by Professor A. Hansen.

Laboratoire de Mécanique et Technologie (LMT), Cachan, France. "On the Importance of Heterogeneity: Surface Effects, Fracture - Recent Results and Open Questions," February 9, 1995. Invited by Professor Geymonat.

Secteur Mécanique & Matériaux, Laboratoire de Mécanique et Technologie, Cachan, France. "On the Fiber-matrix Interface in Metal Matrix & Ceramic Matrix Composites," March 16, 1995. Invited by Professor A. Benallal.

Michigan Technological University, Center for Mechanics of Materials and Instabilities. "Strain Gradients, Localization and Wavelets," July 20, 1995. Invited by Professor E.C. Aifantis.

Wright-Patterson AFB, Ohio, "Use of Wavelets for Multiscale Material Characterization," Aug. 4, 1997, Invited by Dr. T.J. Moran.

Politecnico di Torino, Italy, "Stochastic and Multiscale Material Behavior," May 18-22, 1998 (Lectures totaling 10 hours were given). Invited by Prof. Alberto Carpinteri.

Aristotle University, Thessaloniki, Greece, "Material Structure - Properties, Characterization and Applications," May 27-28, 1998 (Lectures totaling 4 hours were given). Invited by Prof. E.C. Aifantis

University of Dayton, Ohio, "Wavelet Analysis in Mechanics and Materials," September 15, 1998 (Two lectures for the local (Ohio) Multidisciplinary University Research Initiative. Invited by Prof. Theodore Matikas.

Aristotle University, Thessaloniki, Greece, (1) "On the Wavelet Interpretation of Size Dependence in Tensile Strength and Fracture Energy"; (2) "On the Coefficients of Strain gradient Theory: Stochastic Interpretation" January 8, 1999. Invited by Prof. E.C. Aifantis.

Aristotle University, Thessaloniki, Greece, "Multiscale Porosity and Application to Fracture – Stochastic Approach" January 10, 2000. Invited by Prof. E.C. Aifantis.

United Technologies Research Center, Hartford, Connecticut, "Multiscale Material Characterization from Micro to Macro Scales and Applications to Mechanical Properties, Life Prediction, and NDE," March 31, 2000. Invited by Dr. Alex Staroselsky.

Centre de Développement des Géosciences Appliquées – Equipe d'Accueil 1675, Université Bordeaux 1, "Wavelet Methods for the Characterization of Heterogeneous Media, June 11, 2001. Invited by Prof. Denys Breysse.

National Technical Norwegian University, Trondheim, Norway, Department of Physics. "Wavelets and Spatial/Temporal Multiscaling in Engineering and Physics," November 21, 2001. Invited by Professor A. Hansen.

Materials Science and Engineering Department, MSE Colloquium, University of Arizona, "Multiscale Stochastic Modeling of Microstructures – Bridging the Spatial and Temporal Scales from Atomistic to Continuum," September 29, 2003. Invited by Professor J. Simmons.

Iowa State University, "Wavelet-based Bridging of Spatial and Temporal Scales in Simulations and Experiments," April 10, 2006, Invited by Dr. Sreekanth Pannala.

Stuttgart University, "Multiscale Wavelet-based Modeling of Diffusion from a Reactive Boundary," June 5, 2007, Invited by Professor S. Schmauder.

Stuttgart University, "Exchange Program for Engineering Students between the University of Arizona and Stuttgart University," June 11, 2007, Invited by Professor S. Schmauder.

University of Vermont, College of Engineering, "Wavelet-Based Spatially and Temporally Multiscale/Multiphysics Framework," December 12, 2008, Invited by Professor G. Mirchandani.

University of New Mexico, Mechanical Engineering, "Temporal Multiscale Problems in Engineering and Science," May 7, 2010, Invited by Professor J. Heinrich.

Invited Lectures Presented at Conferences/Symposia

Lecture & Paper, Aristotle's Conference, Thessaloniki, Greece, August 19-25, 1990, Aristotle University, Invited by Professor E. Aifantis.

Lecture & Abstract, 22nd Midwestern Mechanics Conference, Missouri-Rolla, October 1991. Invited by Professor H. Zbib.

Lecture & Paper, Symposium on Plastic Flow and Creep, ASME Applied Mechanics Summer Conference, Arizona State University, April 1992. Invited by Professor H. Zbib.

Lecture and Paper, ASCE 92 Specialty Conference, Texas A & M University, May 24-27 1992. Invited by Professors Z. Bazant, J. Mazars, G. Pijaudier-Cabot and S. Sture.

Book Chapter, Damage In Composite Materials, G.Z. Voyiadjis editor, Elsevier, 1993. Invited by Professor G. Voyiadjis.

Lecture & Abstract, Soc. Engr. Sci., 29th Annual Meeting, San Diego, September 14-16, 1992. Invited by Professor B. Loret.

Lecture & Paper, MEET'N'93, Symposium on Micromechanics of Random Media, University of Virginia, June 6-9, 1993. Invited by Professor M. Ostoja-Starzewski and I. Jasiuk.

Lecture & Paper, NATO - ARW 930521 (Advanced Research Workshop) PROBAMAT, Probabilities and Materials: Tests, Models and Applications, Paris Ecole 6, November 1993. Invited by Professors Ostoja-Starzewski and D. Breyse.

Lecture, Symposium on Novel Materials and Processes, Aristotle University, Thessaloniki Greece, Dec. 20-22, 1993. Invited by Professor E.C. Aifantis.

Lecture & Paper, First Int. Conf. Composites Engr., (ICCE/1), New Orleans, Aug. 26-31, 1994. Invited by Dr. N. Pagano.

Lecture & Paper, IUTAM Symposium on Size-Scale Effects in the Failure Mechanisms of Materials and Structures, Torino, Italy, October 1994. Invited by Professor A. Carpinteri.

Lecture, Second Annual GMHE-Wide Advanced Composite Materials Workshop, Composite Materials: the Gateway to Cost Efficient, Competitive Structures, Hughes Aircraft Company, Tucson, Arizona, November 16-17, 1994. Invited by the Hughes Company.

Lecture & Paper, 8^{ème} Colloque National MECAMAT, Mécanismes et Mécanique des Surfaces, Interfaces and Interphases, 16-19 Janvier 1995, Aussois, France. Invited by Professor A. Benallal.

Lecture & Paper, Sessions on Scaling Effects in Discrete and Continuum Models of Failure, 11th ASCE Eng. Mechanics Conf., Ft. Lauderdale, Florida, May 19-22, 1996. Invited by Professors Gilles Pijaudier-Cabot and Zdenek P. Bazant.

Lecture (presented by M.J. Meisner and G. Frantziskonis) XIXth Int. Congress of Theoretical and Applied Mechanics, Kyoto, Japan, August 25-31, 1996, M.J. Meisner, invited by Professor E. Tsuchida.

Lecture, First Euroconference and U.S. Workshop on Material Instabilities in Deformation and Fracture, Porto Carras, Halkidiki, Greece, September 4-7, 1996. Invited by Professor Elias C. Aifantis.

Lecture, and Session Chairman, Prager Symposium, Society of Engineering Science, 33rd Annual Technical Meeting, Tempe, Arizona, October 20-23, 1996. Invited by Professor John Dempsey.

Lecture in cooperative research, NSF workshop on "Characterization of Multiscale and Stochastic Material Microstructure and its Relation to Material Aging, La Jolla, California, February 24-27, 1997, Invited by Professor John McCoy.

Two lectures on "Multiscaling in Pitting Corrosion and in Fretting Fatigue," NDE-MURI, 2nd Annual Review, Dayton, Ohio, September 16, 1998, Invited by Professor T.E. Matikas.

Two lectures on "Multiscaling in Pitting Corrosion and in Fretting Fatigue," SPIE Conference, Newport Beach, California, March 3-5, 1999, Invited by Professor T.E. Matikas.

Lecture, Symposium on Statistical Fracture Processes in Heterogeneous Materials, Society of Engineering Science, 36th Annual Technical Meeting, Austin, Texas, October 25-27, 1999. Invited by Professor S. Leigh Phoenix.

Lecture, Engineering Mechanics Conference of the American Society of Civil Engineers (EM 2000), Austin, Texas, May 21-24, 2000. Invited by Professors L. Graham and R. Ghanem.

Lecture, First International conference on Multiscale Materials Phenomena in Harsh Environments, Limassol, Cyprus, June 19-24, 2000. Invited by Professor George Voyiadgis.

Lecture, Mini Symposium on Fatigue/Microstructure in Aluminum Casting Alloys, University of Arizona, January 18-19, 2001. Invited by Professor David Poirier.

Lecture, International Conference on Structural Safety and Reliability, ICOSSAR 2001, Newport Beach, California, June 18-21, 2001. Invited by Professors L. Graham and G. Deodatis.

Lecture, and Session Chairman, 6th National Congress on Mechanics, Thessaloniki Greece, July 19-21, 2001, Invited by Professor Elias C. Aifantis.

Lecture, NSF-FHWA Workshop on Imaging and Simulation of Concrete Microstructure, Northwestern University, Evanston, Illinois, July 20-23, 2003. Invited by Professors D. Corr and S.P. Shah

Lecture, McMat 2005, Mechanics and Materials Conference, Baton Rouge, Louisiana, June 1-3, 2005, Lecture in Honor of Professor E.C. Aifantis, Invited by Dr. D. Bammann and Prof. H. Zbib.

Lecture, PROBAMAT 2005, Probabilities and Materials, from Nano to Macro Scale, John Hopkins University, January 5-7, 2005.

Lecture for Micro-Mesoscopic Modeling of Heterogeneous Chemically Reacting Flows Over Catalytic/Solid Surfaces (MMHCRF Workshop), "Compound Wavelet Matrix (CWM) for MMHCRF – Additional Details On the Algorithm Implementation," April 10-11, 2006, Ames Laboratory, Iowa.

Lecture for Micro-Mesoscopic Modeling of Heterogeneous Chemically Reacting Flows Over Catalytic/Solid Surfaces (MMHCRF Workshop), "Kinetic Monte Carlo Methods for Specific Chemical Reactions," April 10-11, 2006, Ames Laboratory, Iowa.

Lecture, SIAM Conference on Computational Science and Engineering (CSE07), Costa Mesa, California, February 19-23, 2007, Invited by Dr. S. Pannala.

Lecture, 6th Annual International Conference on Civil Engineering & 1st Annual International Conference on Structural Engineering and Mechanics, Athens, Greece, June 20-23, 2016.

Additional, Speaker/ Participant at Professional Conferences

Fifth International Conference on Numerical Methods in Geomechanics, Nagoya, Japan, April 1-5, 1985.

11th U.S. National Congress of Applied Mechanics, Tucson Arizona, May 1990.

ASME 1990 Winter Annual Meeting, Participant, Dallas, Texas, November 1990.

Secretary for 3rd Int. Conf. on Constitutive Laws for Eng. Matls., Participant, Tucson, Arizona, January 1991.

Computer Methods and Advances in Geomechanics, Cairns, Australia, May 1991.

1992 ASME Applied Mechanics Conference, Participant, (also, Session Chairman), Scottsdale, Arizona, April 28 - May 1, 1992.

Ninth Engineering Mechanics Conference, ASCE, Participant, Speaker, College Station Texas, May 25-27, 1992.

Workshop on Multiscale Modeling and Simulation of Flow and Transport in Porous Media, Los Alamos, New Mexico, August 11-13, 1999.

Lecture, 10th IACMAG, Tucson, Arizona, 7-12 January 2001.

Lecture, "Time Parallel Multiscale/multiphysics Framework," 3rd IC-SCCE, Athens, Greece, 9-12 July 2008.

Lecture, Nanostructural High Performance Multifunctional Material Systems Mechanical, Materials and Structures Technology Network 9th Annual Raytheon-Wide Symposium – University Session, Tucson, Arizona, October 22, 2009.

Workshop on Energy Storage and Its Value to the Electrical Grid, February 17, 2011, Tucson, Arizona.

AWARDS (major)

Presidential Young Investigator Award, under President George Bush; award administered by the National Science Foundation, April 1991.

Fulbright scholarship for six-month visit to the Department of Theoretical Physics, Trondheim, Norway, 2001.

TEACHING AND DEVELOPMENT

Undergraduate Education

Course Experience and Relevant Activities

- Fundamentals of Engineering Design—Hands-on team based experience for freshmen
- Engineering Mechanics, Statics—Core Engineering course
- Computer programming for Civil Engineers
- Strength of Materials—This core course is currently being modified to incorporate learning via the internet, particularly with respect to interactive homework completion. It has also been taught in Grenoble, France, during a sabbatical leave.
- Engineering Design Graphics—Computer based drafting.
- Junior Field Trip—Practicum experience for Juniors
- Materials Laboratory—experimental property identification of various engineering materials
- Engineering Design—Senior design project, a major, team based, Engineering Project
- Introductory Finite Element Analysis—Technical elective course for seniors
- Aerospace and Mechanical Engineering Senior Design Project (team mentoring)

Graduate Education

Course Experience and Relevant Activities

- Theory of Elasticity and Applications—Research as well as application oriented basic elasticity theory; students majoring in various Engineering disciplines (Mechanics, Aerospace, Mechanical, Mining, Applied Math, etc.) take this course
- Plasticity Theory and Applications—Computationally and research oriented plasticity for “traditional” and modern materials
- Energy Methods in Mechanics—This “classical” course has been extended to include energy based stability, and chaotic behavior of structures
- Continuum Mechanics—Basic principles of solid mechanics
- Fracture Mechanics—This includes traditional and nontraditional themes, i.e. statistical fracture, scaling phenomena, numerical analysis, etc.

Advanced tools, i.e. symbolic computations by computer, and numerical computations using the program *Mathematica* have been incorporated in some graduate courses.

Multimedia technologies are progressively incorporated into undergraduate and graduate education.

TEACHING RECOGNITIONS & GRANTS

Recognitions

Nominated for Five-Star Faculty Award, Honors Program, University of Arizona, April 1990 and April 1991.

Tau Beta Pi, Engineer in Training (EIT) Professor Recognition, April 1992 and April 1993.

One of the instructors for ENGR 102 (Introduction to Engineering Design). The course, while I was one of the instructors, was selected for the 1997 “University-wide Teaching Award for Meritorious Departmental Achievement in Undergraduate Education.”

Grants

“Upgrading and Modernizing the Undergraduate Laboratories of the CEEM Department,”
Source of Funding: Office of the Dean, College of Engineering and Mines, \$36,000, 1997-

1998. Proposal was written and upgrading executed by G. Frantziskonis (Chair), M. Budhu, S. Ince, and P. Boyle.

"Upgrading and Modernizing the Undergraduate Laboratories of the CEEM Department," Source of Funding: Office of the Dean, College of Engineering and Mines, \$30,000, 1998. Proposals were written by some faculty members and submitted by the CEEM Department Head. G. Frantziskonis prepared one of the proposals.

REVIEW OF EDUCATIONAL PRODUCTS

Multimedia Engineering Statics (on CD-ROM) for Addison-Wesley.

Rationale for developing a deformable bodies/strength of materials multimedia product, for Addison-Wesley.

Book Review: "Mechanics of Tectonic Faulting," by G. Mandl, for Elsevier Publishers.

Graduate and Undergraduate Research Supervision

Master of Science

- i. David J. Daniewicz, AeroJet Engineer, Sacramento, California, "Edge Delamination in Advanced Laminated Composites, Theory and Verification," MSc advisor, May 1990. One (1) refereed journal papers has been co-authored with Mr. Daniewicz.
- ii. Xiaozhen Yuan, City of Los Angeles, Engineering Division, "Random Initial Inhomogeneity in Brittle Materials," MSc advisor, May 1991.
- iii. S. (Rama) Ramakrishnan, Intel Engineer, "Micro-Structure in Particulate Media, A Lattice Type Approach," MSc co-advisor, May 1993.
- iv. Yang Yang, Terracon Consultants West, Inc., Phoenix, Arizona, "Spatial Correlation and Size Effect in Brittle Materials," MSc advisor, September 1993.
- v. Sha Lu, Consulting Engineer, P.R. China, "Three Dimensional Lattice Analysis and Application to Fracture Problems," MSc advisor, March 1994.
- vi. Gang Hong, City of Los Angeles Engineer, "Hygrothermal Degradation in Glass-Epoxy— Evaluation Via Stress Wave Factors," MSc advisor, May 1995.
- vii. Xiaoxen Li, Consultant, Tucson, Arizona, "Nondestructive Evaluation of Moisture Effects in Wood," MSc advisor, April 1998.
- viii. Chris Haynie, Raytheon Engineer, "Wavelet Analysis of Multiscale Experimental Data," MSc advisor, May 2000. One (1) paper in conference proceedings have been co-authored with Mr. Haynie.
- ix. Grant Watanabe, Naval Engineer, "Experimental Investigation of Size Effects in Concrete," MSc advisor May 2000.
- x. Songxing Chen, "A Process for Studying Physical Phenomena with Diverse Statistical Information at Various Spatial Scales," MSc advisor, April 2004.
- xi. Siddharth Vad, "Numerical Simulation of the DRE Exam for Early Detection of Prostate Cancer," in progress.
- xii. Jason Ruhl, Veeco Instruments engineer, "Flexure Based Constant Force Mechanisms," MSc advisor, July 2009.
- xiii. Mark Alvarez, "Small Scale Compressed Air Energy Storage Systems," MSc advisor, December 2010.
- xiv. John-Jozef Proczka, "Small Scale Compressed Air Energy Storage: Pressure Vessel and Foundation Feasibility," MSc advisor, July 2012.

Doctor of Philosophy

- i. Fang F. Tang, "Degradation Mechanisms, Energy Dissipation and Instabilities in Brittle Materials," PhD advisor, May 1992. Three (3) refereed journal papers and one (1) paper in conference proceedings have been co-authored with Dr. Tang.
- ii. Mark Meisner, "Heterogeneity in Engineering Materials: Cases of Discrete and Statistical Disorder," PhD advisor, March 1994. Three (3) refereed journal papers and one (1) paper in conference proceedings have been co-authored with Dr. Meisner.
- iii. S. Ramakrishnan, "Mechanics of Particulate Media. A Lattice Type Approach," PhD co-advisor, April 1997. One (1) refereed journal papers and four (4) papers in conference proceedings have been published with Dr. Ramakrishnan.
- iv. Gang Hong, "Sub-frequency Range Stress Wave Factor NDE Technique for Assessing Damage in Fiber-Epoxy Composites, PhD advisor, December 2000. Two (2) refereed journal papers and one (1) paper in conference proceedings have been co-authored with Dr. Hong.
- v. Blain Olbert (in Progress) Ph.D. co-Advisor.
- vi. Chris Haynie, in progress.
- vii. Sudib Mishra, "Development of a Multiscale and Multiphysics Simulation Framework for Reaction-Diffusion-Convection Problems," PhD advisor, May 2009. Six (6) refereed journal papers and one (1) paper in conference proceedings have been co-authored with Dr. Mishra.
- viii. Darrick Buban, "Shape Memory Alloy Fracture as a Deployment Actuator," PhD advisor, May 2013. One (1) refereed journal paper and one (1) paper in conference proceedings have been co-authored with Dr. Buban.
- ix. Sourav Gur, in progress, 2016.
- x. Brian Snider-Simon, in progress, 2016.

Undergraduates in Research/Education (financially supported advisees)

- Michael Vanzeeland, Engineering Physics Major, 1995 - 1996
- Brenda Wilden, Physics Major, 1995 - 1996
- Edgar Ortiz, Engineering Major, 1999.
- Simon Levine, Engineering Major, 1999 – 2001.
- Charles Butler, Engineering Major, 1999 – 2002.
- Sulakshana Ramkumar, 2011-present

Graduate Student Committee Service

Served as committee member to several M.Sc. Theses, Engineering Mechanics, Civil Engineering, Mining Engineering.

Served as committee member to numerous Ph.D. Dissertations, Engineering Mechanics, Civil, Aerospace, Mechanical, Mining Engineering, Hydrology and Water Resources, Material Science and Engineering.

UNIVERSITY AND COMMUNITY SERVICE

OUTREACH

Mini Lectures to High School students, several occasions, 1994-present. Lectures given at The University of Arizona or at the High Schools, including Amphitheater High School, Mountain View High School, and others.

Mini Lectures to Engineering 102 Students, several occasions, 1992-present.

INTRAMURAL SERVICE

Departmental Committees/Activities:

- Faculty, Ph.D. Qualifying Exam, 1988 - present.
- Faculty, Ph.D. Preliminary Examination, 1989 - present.
- Member, Undergraduate Studies Committee, 1993-1995.
- Member, Annual Performance Evaluation Committee, for 1992-93 and 1995-96.
- Member, Computer Committee, 1993-1994.
- Member, Departmental Committee on Scholarship, 1995-96.
- Development of Departmental World Wide Web home page, 1995-1998.
- Departmental Strategic Planning Task Force: member of the following units: standardize lab courses; review overall curriculum; interview faculty, staff, students, 1996-1997.
- Chair, Undergraduate Laboratories - Materials, Hydraulics, Soils, Asphalt - Improvement Committee, Spring 1996-present. Note: grants and activities relevant to this committee are described elsewhere in this CV.
- Member, TA Allocation Process Team, 1997.
- Volunteer Faculty for helping students prepare for the FE (Fundamentals of Engineering) exam, Review of Statics: Fall 1995, Spring 1996, Spring 1997, Fall 1997, Spring 1998, Fall 1998, Spring 1999.
- Member, Undergraduate Curriculum Studies Committee, Fall 1999 – Spring 2005.
- Chair, Graduate Curriculum Studies Committee, Fall 2006 – 2007, 2009-2015.

College Committees:

- Member (elected), College of Engineering and Mines Advisory Committee, 1995-1999, 2009-.
- Member, Criteria 2000 Assessment Task Force (ABET), 1996-1998.
- Member, Sabbatical Leave Advisory Committee, 1997, 1999.
- Chair, Sabbatical Leave Advisory Committee, 1998.
- Member, Post-tenure review committee, 2002-2003.
- Member, School of Sustainable Engineering Systems, Graduate Education Committee, 2009-

University Committees:

- Member, Department Head Fifth Year Review Committee, 1996-97, 2002-03.
- Designated as one of the five *Mathematica* technical support personnel at the University of Arizona under the University-wide site license, current.
- Member, University Loss Control Team, 1996-1998. Also member: Team on Loss Control University-wide training, 1997.
- Member, University Committee on High Performance Computing, March 1998-March 2007.
- Member, Committee on Ethics and Commitment, 1998-2006.

- Member, Regent's Professorship University Committee, September-October, 2008 and 2009.
- Member, Institutional Review Committee, 2009-2012.
- Member, University Committee on Promotion and Tenure, 2013-2014.
- Co-Chair, University Committee on Promotion and Tenure, 2014-2016.

EXTRAMURAL SERVICE

- Consultant/Reviewer, NATO Advanced Research Workshop on Probabilities and Materials, ARW-930521, 1993-94.
- Co-organizer of symposium on: "Strain - Localization and Instabilities in Materials," for the 32nd Annual Meeting of the Society of Engineering Science, Oct. 29, Nov. 1, 1995.
- Co-organizer of Symposium on: "Mechanics of Granular Media," for the 32nd Annual Meeting of the Society of Engineering Science, Oct. 29, Nov. 1, 1995.
- Director (Co-Director: Oleg Naimark, Russian Academy of Sciences, Perm, Russia), NATO ARW (Advanced Research Workshop) PROBAMAT, Perm, Russia, September 1997. (See list of publications for NATO ASI book produced from this workshop).
- Member - Local Organizing Committee, 10th International Conference on Computer Methods and Advances in geomechanics, Jan. 7-12, 2001, Tucson, Arizona. Invited by Prof. C. S. Desai.
- Member – International Scientific Committee, International Conference on Structural Safety and Reliability, June 17-22, 2001, Newport Beach, California. Invited by Prof. R.B. Corotis.
- Member – International Scientific Committee, International Conference on Structural Safety and Reliability, Rome, Italy, June 19-23, 2005.
- American Society of Mechanical Engineers/Applied Mechanics Division (ASME/AMD), Committee on Uncertainty and Probabilities (COUP), Member, since 2002.
- Member – Organizing Committee, PROBAMAT 2005, Probabilities and Materials, from Nano to Macro Scale, John Hopkins University, January 5-7, 2005.
- Member, Committee on Uncertainty and Probabilistics (COUP) of the Applied Mechanics Division of the American Society of Mechanical Engineers (ASME), since 2003.
- Member, Board of Experts of the CIVR (Committee for Research Evaluation, Italian Ministry of Education, University and Scientific Research, since 2004.
- Reviewer, Ministero dell'Istruzione, dell'Università e della Ricerca (MURST), Progetti di Ricerca di Interesse Nazionale (PRIN), (Italian Ministry for Universities and Research), since 2006.
- Chair, ASME committee on multidisciplinary probabilistic methods in materials, nominated chair, since 2009.
- Member of the Editorial Board, Journal of the Mechanical Behavior of Materials, Since 2005.
- Organizing Committee Member, Jointedrock2009 Conference, Tucson, Arizona, January 7-9, 2009.
- Editorial Board Member, Multiscale and Multiphysics Mechanics (MMM), An International journal, since 2016.
- Editorial Board Member, The Scientific Pages of Metallurgical and Material Engineering, since 2016.