Konstantinos P. Baxevanakis

Postdoctoral Research Associate – Visiting Assistant Teaching Professor

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Education

2014 *Doctor of Philosophy* in Applied Mechanics, School of Applied Mathematical and Physical Science, National Technical University of Athens, Greece

2008 *Master of Philosophy* in Engineering, University of Cambridge, United Kingdom

2006 *Diploma* (B.Sc./M.Eng.) in Civil Engineering with First Class Honours (GPA 8.71/10, class rank 1st), University of Thessaly, Greece

Professional Experience

2016 – present Visiting Assistant Teaching Professor, Department of Mechanical Engineering & Mechanics, Drexel University

2014 – present Postdoctoral Research Associate, Department of Mechanical Engineering & Mechanics, Drexel University

2008 – 2014 Research Associate, School of Applied Mathematical and Physical Science, National Technical University of Athens

2006 – 2007 Research Associate, Department of Engineering, University of Cambridge

2002 – 2006 Research Assistant, Laboratory of Strength of Materials and Micromechanics, Department of Civil Engineering, University of Thessaly

Research Interests

Dislocations, Fracture Mechanics, Micromechanics, Crystal Plasticity, Wave Propagation, Generalized Continua, Contact Mechanics, Analytical and Numerical Methods

Scholarships and Awards

2008 Technical Chamber of Greece Honorary Diploma

2006 George and Marie Vergottis Cambridge Bursary, Cambridge European Trust

2002 – 2006 Hellenic State Scholarships Foundation Scholarship

2002 – 2004 Technical Chamber of Greece Award

2002 – 2004 Deligeorgis Foundation Award

Teaching Experience

- Instructor for 'MEM 592: Applied Engineering Analysis Methods II', Graduate Course, Mechanical Engineering & Mechanics Department, Drexel University, Winter Quarter 2017.
- Lead instructor for 'MEM 591: Applied Engineering Analysis Methods I', Graduate Course, Mechanical Engineering & Mechanics Department, Drexel University, Fall Quarter 2016.
- Substitute lectures for 'MEM 423: Mechanics of Vibration', Undergraduate Course, Mechanical Engineering & Mechanics Department, Drexel University, Spring Quarter 2016.
- Substitute lectures for 'MEM 202: Engineering Mechanics: Statics', Undergraduate Course, Mechanical Engineering & Mechanics Department, Drexel University, Spring Quarter 2015.
- Teaching Assistant for 'Advanced Strength of Materials', Undergraduate Course, School of Civil Engineering, National Technical University of Athens, Spring Semesters 2012, 2013, 2014.
- Teaching Assistant for 'Elasticity Theory', Graduate Course, School of Applied Mathematical & Physical Sciences, National Technical University of Athens, Fall Semesters 2011, 2012, 2013.
- Teaching Assistant for 'Continuum Mechanics', Undergraduate Course, School of Applied Mathematical & Physical Sciences, National Technical University of Athens, Fall Semester 2012, 2013.

Research Experience

10/2014 – present Researcher in project '*Microstructure-Sensitive Investigations of Fatigue of Magnesium Alloys*'. US National Science Foundation Grant 2014.
Principal Investigator: Associate Prof. Antonios Kontsos.

10/2014 – present Researcher in project '*Identification of Fatigue Precursors for Multi-scale NDE & Prognostics*'. US Office of Naval Research Young Investigator Program 2014.
Principal Investigator: Associate Prof. Antonios Kontsos.

05/2015 – 08/2015 Researcher in project '*Characterization of Contrast Agents for Medical Imaging and Drug Delivery with Ultrasound via Theoretical & Numerical Analysis of Static & Dynamic Response*'. Action "Excellence I" (Greek General Secretariat for Research and Technology Program for Education and Lifelong Learning).
Principal Investigator Prof. Nikos Pelekasis.

04/2015 – 08/2015 Researcher in project '*Fatigue of Materials Used in Vascular Surgery*'. Action "Excellence II" (Greek GSRT Program for Education and Lifelong Learning).
Principal Investigator Prof. Antonios E. Giannakopoulos.

03/2013 – 02/2015 Researcher in project 'Detection Evaluation and Total Control of Rolling Contact Fatigue (RCF) in Rails'. Action 'Cooperation' (Greek GSRT Operational Programme for Competitiveness and Entrepreneurship).
Principal Investigator: Prof. Gregory Haidemenopoulos.

02/2012 – 05/2012 Researcher in project 'Dynamic Fracture and Contact within the Framework of Generalized Continua and Thermo-Mechanics'. NTUA program for Basic Research.
Principal Investigator: Prof. Haralambos G. Georgiadis.

Publications in Refereed Journals

[J7] J.A. Cuadra, **K.P. Baxevanakis**, M. Mazzotti, I. Bartoli and A. Kontsos, 2016. Energy dissipation via acoustic emission in ductile crack initiation, *International Journal of Fracture* 199, 89-104. doi: 10.1007/s10704-016-0096-8.

[J6] P.A. Gourgiotis, Th. Zisis and **K.P. Baxevanakis**, 2016. Analysis of the tilted flat punch in couple-stress elasticity, *International Journal of Solids and Structures* 85-86, 34-43. doi: 10.1016/j.ijsolstr.2016.01.017.

[J5] J. Cuadra, **K.P. Baxevanakis**, A. Loghin and A. Kontsos, 2016. Validation of a cyclic plasticity computational method using fatigue full field deformation measurements, *Fatigue & Fracture of Engineering Materials & Structures* 39, 722-736. doi: 10.1111/ffe.12396.

[J4] **K.P. Baxevanakis** and A.E. Giannakopoulos, 2015. Finite element analysis of discrete edge dislocations: Configurational forces and conserved integrals, *International Journal of Solids and Structures* 62, 52-65. doi: 10.1016/j.ijsolstr.2015.01.025.

[J3] Th. Zisis, P.A. Gourgiotis, **K.P. Baxevanakis** and H.G. Georgiadis, 2014. Some basic contact problems in couple stress elasticity, *International Journal of Solids and Structures* 51, 2084-2095. doi: 10.1016/j.ijsolstr.2014.02.016.

[J2] **K.P. Baxevanakis** and A.E. Giannakopoulos, 2010. Finite element analysis of discrete circular dislocations, *CMES - Computer Modeling in Engineering and Sciences* 60, 181-198. doi: 10.3970/cmes.2010.060.181. Erratum (2014): CMES 97, 535-544. doi: 10.3970/cmes.2014.097.535.

[J1] A.E. Giannakopoulos, **K.P. Baxevanakis** and A. Gouldstone, 2007. Finite element analysis of Volterra dislocations in anisotropic crystals: A thermal analogue, *Archive of Applied Mechanics* 77, 113-122. doi: 10.1007/s00419-006-0065-1.

Submitted

[S2] **K.P. Baxevanakis**, P.A. Gourgiotis and H.G. Georgiadis. Interaction of cracks with dislocations in couple-stress elasticity. Part II: Shear modes.

[S1] **K.P. Baxevanakis**, P.A. Gourgiotis and H.G. Georgiadis. Interaction of cracks with dislocations in couple-stress elasticity. Part I: Opening mode.

Theses

[T3] "*A computational approach for problems of interacting dislocations and cracks*", Doctor of Philosophy dissertation, School of Applied Mathematical and Physical Science, National Technical University of Athens, Greece.
Advisor: Prof. Haralambos G. Georgiadis.

[T2] "*Microstructure modelling of tendons*", Master of Philosophy thesis, Department of Engineering, University of Cambridge, United Kingdom.
Advisor: Dr. Michael Sutcliffe.

[T1] "*Finite element analysis of dislocations*", Diploma thesis, Department of Civil Engineering, University of Thessaly, Greece.
Advisor: Prof. Antonios E. Giannakopoulos.

Publications in Refereed Conference Proceedings

[CP4] **K.P. Baxevanakis**, P.A. Gourgiotis and H.G. Georgiadis. Interaction of cracks with dislocations in couple-stress elasticity, *10th HSTAM International Congress on Mechanics*, Chania, Greece, May 25-27, 2013.

[CP3] Th. Zisis, P.A. Gourgiotis, **K.P. Baxevanakis** and H.G. Georgiadis. Plane strain contact problems in couple-stress elasticity, *10th HSTAM International Congress on Mechanics*, Chania, Greece, May 25-27, 2013.

[CP2] **K.P. Baxevanakis** and A.E. Giannakopoulos. Finite element analysis of Volterra dislocation loops, *4th International Conference from Scientific Computing to Computational Engineering (IC-SCCE)*, Athens, Greece, July 7-10, 2010.

[CP1] A.E. Giannakopoulos and **K.P. Baxevanakis**. Finite element analysis of discrete circular dislocations, *2nd South East Conference on Computational Mechanics (SEECCM 2009)*, Rhodes, Greece, June 22-24, 2009 [Keynote paper].

Presentations in Conferences without Proceedings

[C22] A. Kontsos, B. Wisner and **K.P. Baxevanakis**. Particle fracture effects in microplasticity and damage of aluminum alloys, *International Symposium on Plasticity and Its Current Applications*, Puerto Vallarta, Mexico, January 3-9, 2017.

[C21] R. Whitmore, S. Rajaram, B. Wisner, **K.P. Baxevanakis** and A. Kontsos. Diagnostics and prognostics for vibrating structures based on microstructure-based damage precursors, *ASME 2016 International Mechanical Engineering Congress & Exposition (IMECE)*, Phoenix (AZ), USA, November 11-17, 2016.

[C20] **K.P. Baxevanakis** and A. Kontsos. Modeling of twin-induced shear bands in magnesium alloys, *Society of Engineering Science 53nd Annual Technical Meeting*, College Park (MD), USA, October 2-5, 2016.

[C19] R. Whitmore, S. Rajaram, B. Wisner, **K.P. Baxevanakis** and A. Kontsos. Computationally driven damage in structures from microstructure based damage mechanisms, *Society of Engineering Science 53nd Annual Technical Meeting*, College Park (MD), USA, October 2-5, 2016.

[C18] **K.P. Baxevanakis**, J. Cuadra, A. Loghin and A. Kontsos. Characterization of fatigue crack growth using a cyclic plasticity computational model and full-field deformation measurements, *International Conference on Fatigue Damage of Structural Materials XI*, Hyannis (MA), USA, September 18-23, 2016.

[C17] A. Kontsos and **K.P. Baxevanakis**. Microstructure-driven computational modeling of shear bands in Mg alloys, *IUTAM Symposium on Integrated Computational Structure-Material Modeling of Deformation and Failure under Extreme Conditions*, Baltimore (MD), USA, June 20-22, 2016.

[C16] Th. Zisis, P.A. Gourgiotis, **K.P. Baxevanakis** and H.G. Georgiadis. Analysis of the tilted flat punch in couple-stress elasticity, *11th HSTAM International Congress on Mechanics*, Athens, Greece, May 27-30, 2016.

[C15] S. Rajaram, R. Whitmore, B.J. Wisner, **K.P. Baxevanakis** and A. Kontsos. Acoustic emission as a link between diagnostics and prognostics, *58th Acoustic Emission Working Group Meeting (AEWG-58)*, Philadelphia (PA), USA, May 22-25, 2016.

[C14] **K.P. Baxevanakis**, J. Cuadra, A. Loghin and A. Kontsos. Fatigue crack growth characterization using an integrated full field deformation and cyclic plasticity method, *The Minerals, Metals and Materials Society (TMS) 145th Annual Meeting and Exhibition*, Nashville (TN), USA, February 14-18, 2016.

[C13] A. Kontsos, **K.P. Baxevanakis** and M. Cabal. Computational modeling of microstructure-dependent strain localization in magnesium alloys, *International Symposium on Plasticity and Its Current Applications*, Keauhou Bay (HI), USA, January 3-9, 2016.

[C12] **K.P. Baxevanakis**, M. Cabal, J. Cuadra and A. Kontsos. Microstructure-sensitive strain localization modeling in magnesium alloys, *ASME 2015 International Mechanical Engineering Congress & Exposition (IMECE)*, Houston (TX), USA, November 13-19, 2015.

[C11] **K.P. Baxevanakis**, J. Cuadra, M. Mazzotti, I. Bartoli and A. Kontsos. Integrated approach to forward modeling of acoustic emission in ductile fracture, *Society of Engineering Science 52nd Annual Technical Meeting*, College Station (TX), USA, October 26-28, 2015.

[C10] **K.P. Baxevanakis**, J. Cuadra, D. Liu and A. Kontsos. Modeling of the transient energy release due to damage initiation, *13th US National Congress on Computational Mechanics*, San Diego (CA), USA, July 26-30, 2015.

[C9] **K.P. Baxevanakis**, H.G. Georgiadis and P.A. Gourgiotis. A displacement based formulation for crack problems in couple-stress elasticity, *8th GRACM International Congress on Computational Mechanics*, Volos, Greece, July 12-15, 2015.

[C8] **K.P. Baxevanakis** and A.E. Giannakopoulos. A finite element method for the simulation of crystal defects, *8th GRACM International Congress on Computational Mechanics*, Volos, Greece, July 12-15, 2015.

[C7] A.E. Giannakopoulos and **K.P. Baxevanakis**. Fracture and fatigue analysis of 3D cracks that appear in railway steels, *4th International Conference of Engineering Against Failure (ICEAF)*, Skiathos, Greece, June 24-26, 2015.

[C6] A.E. Giannakopoulos and **K.P. Baxevanakis**. Crack deflection of a fatigue crack initiated by rolling contact fatigue, *4th International Conference of Engineering Against Failure (ICEAF)*, Skiathos, Greece, June 24-26, 2015.

[C5] M. Cabal, B. Wisner, **K.P. Baxevanakis**, J. Hochhalter and A. Kontsos. Microstructurally-driven validation & quantification of acoustic emission due to twinning in magnesium, *57th Acoustic Emission Working Group Meeting (AEWG-57)*, Chicago (IL), USA, May 13-15, 2015.

[C4] **K.P. Baxevanakis**, P.A. Gourgiotis and H.G. Georgiadis. Interaction of cracks with dislocations and dislocation dipoles in couple stress elasticity, *Euromech Colloquium 563 − Generalized Continua and their application to design of composites and metamaterials*, Cisterna di Latina, Italy, March 17-21, 2014.

[C3] **K.P. Baxevanakis** and A.E. Giannakopoulos. Finite element analysis of discrete edge dislocations having variable core, *6th International Symposium on Defect and Material Mechanics (ISDMM13)*, Nantes, France, July 1-3, 2013.

[C2] A.E. Giannakopoulos and **K.P. Baxevanakis**. Finite element analysis of dislocations, *5th International Symposium on Defect and Material Mechanics (ISDMM11)*, Seville, Spain, June 27 - July 1, 2011.

[C1] A.E. Giannakopoulos, **K.P. Baxevanakis** and A. Gouldstone. Finite element analysis of Volterra-type disclocations: A thermal analogue, *International Symposium on the Mechanics of Material Forces*, Symi, Greece, July 3-8, 2005.

Invited Lectures

[L1] **K.P. Baxevanakis**, P.A. Gourgiotis and H.G. Georgiadis. Interaction of cracks with dislocations in couple-stress elasticity. *Department of Civil, Environmental & Mechanical Engineering, University of Trento*, Italy, November 21, 2013.

Professional Activities

Reviewer:

Computer Modeling in Engineering & Sciences, Fatigue & Fracture of Engineering Materials & Structures, International Journal of Applied Mechanics, International Journal of Solids and Structures, Journal of Engineering Materials and Technology, Materials Research

Membership in Scholarly Societies:

American Society of Mechanical Engineers (ASME), Association of Civil Engineers of Greece (ACEG), European Mechanics Society, Society of Engineering Science (SES), Technical Chamber of Greece (TCG), The Minerals, Metals & Materials Society (TMS), United States Association for Computational Mechanics (USACM)

Service to Drexel University

2015 Research Day Judge

Languages

- **English**: Excellent – Certificate of Proficiency in English (University of Michigan), TOEFL (280/300)
- **French**: Advanced – Delf A1-A6
- **Greek:** Excellent – Native speaker

Other Skills

- Experience in using the mathematical programs Mathematica, Matlab, Maple, and programming language Fortran.
- Experience in using the Finite Element codes ABAQUS (with user subroutines), ANSYS, and structural analysis software SAP2000, VK Strad and Steel.
- Excellent use of office applications Microsoft Office, Latex, and CAD software Autocad, Photoshop.
- Designed and maintained the webpage of the Hellenic Society for Theoretical & Applied Mechanics (HSTAM), http://hstam.ntua.gr.

References

Prof. Haralambos G. Georgiadis
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Department of Engineering, University of Cambridge,
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