IOANNIS KALOGERIS

School of Civil Engineering, National Technical University of Athens
Laboratory of Structural Analysis and Seismic Research
e-mail: *ikalog@mail.ntua.gr*, *yianniskalogeris@gmail.com*

PROFILE

My general interest lies in the field of Applied and Computational Mechanics. Particularly, my research activity is focused on advanced finite element methods, analysis and design of composite materials, computational methods for uncertainty quantification and reliability, Bayesian approaches for model parameter inference and machine learning techniques for surrogate modeling. This research has led to the development of novel methodologies and algorithms, capable of handling computationally challenging engineering problems, such as stochastic nonlinear dynamic analysis of structures and multiscale analysis of structures comprised of reinforced composites. I have participated in various European research programs relevant to the aforementioned subjects, from which I gained valuable experience and knowledge. Moreover, I have published several research papers in high impact factor scientific journals and presented my research at international conferences, as well. Lastly, I am a member of the MGroup research team (https://github.com/mgroupntua/), actively working on the development of a multi-purpose finite element software for advanced engineering applications.

EDUCATION

Ph.D. in Computational Mechanics *Oct. 2014 - Feb. 2020*
National Technical University of Athens
School of Civil Engineering
Institute of Structural Analysis & Seismic Research
Ph.D. thesis title: *Advanced surrogate modeling and machine learning methods in computational stochastic mechanics*

M.Sc in Analysis and Design of Structures *Sep. 2012 - Jul. 2014*
National Technical University of Athens — Very Good 8.87/10.0
School of Civil Engineering
Institute of Structural Analysis & Seismic Research

Bachelor in Mathematics *Mar. 2017 - Nov. 2020*
National and Kapodistrian University of Athens — Very Good 8.00/10.0
School of Science
Department of Mathematics
Concentration: *Theoretical Mathematics*

Diploma in Civil Engineering *Sep. 2006 - Oct. 2011*
National Technical University of Athens — Very Good 7.54/10.0
School of Civil Engineering
Institute of Structural Analysis & Seismic Research
Concentration: *Structural Engineering*

Certificate of graduation (High School) *Sep. 2003 - 2006*
Kareas High School, Athens — Excellent 19.25/20.0

ACADEMIC PROGRESSION

Contract lecturer *Oct. 2022 - Sep. 2023*
University of Thessaly
Department of Civil Engineering

Postdoctoral researcher in Computational Mechanics *Nov. 2021 - Apr. 2022*
Eidgenössiche Technische Hochschule Zürich
Department of Mechanical and Process Engineering

Postdoctoral researcher in Computational Mechanics *Feb. 2020 - Oct. 2021*
National Technical University of Athens *Apr. 2022 - to date*
School of Civil Engineering
Institute of Structural Analysis & Seismic Research

TECHNICAL SKILLS & OTHERS

Programming Languages	C#, Python, Fortran
Scientific Software	MATLAB, Mathematica, Maple, Abaqus, Ansys, Sap2000
Other Software	LaTeX, Microsoft Office
Languages	Greek, Engish-Proficiency of Cambridge, German-Mittelstufe
Military Service	completed (Oct. 2011 - Jun. 2012)

PUBLICATIONS IN SCIENTIFIC JOURNALS

1. Attia M., Khandaker M.A.H., Pyrialakos S., **Kalogeris I.**, *Enhancing the performance of anti-blast windows through the use of carbon nanotube reinforced polymer gaskets*, Journal of Building Engineering, 2023
2. Pyrialakos S., **Kalogeris I.**, Papadopoulos V., *Multiscale analysis of nonlinear systems using a hierarchy of deep neural networks*, International Journal of Solids and Structures, 2023
3. Papadopoulos L., Bakalakos S., Nikolopoulos S., **Kalogeris I.**, Papadopoulos V., *A computational framework for the indirect estimation of interface thermal resistance of composite materials using XPINNs*, International Journal of Heat and Mass Transfer, vol. 200, 2023
4. **Kalogeris I.**, Pyrialakos S., Kokkinos O., Papadopoulos V., *Stochastic optimization of carbon nanotube reinforced concrete for enhanced structural performance*, Engineering with Computers, doi: https://doi.org/10.1007/s00366-022-01693-8, 2022
5. Nikolopoulos S., **Kalogeris I.**, Papadopoulos V., *Machine learning accelerated transient analysis of stochastic nonlinear structures*, Engineering Structures, vol. 257. 2022
6. Fuhg, J.N., **Kalogeris I.**, Fau, A., Bouklas, N., *Interval and fuzzy physics-informed neural networks for uncertain fields*, Probabilistic Engineering Mechanics, vol. 68, 2022
7. Nikolopoulos S., **Kalogeris I.**, Papadopoulos V., *Non-intrusive surrogate modeling for parametrized time-dependent PDEs using convolutional autoencoders*, Engineering Applications of Artificial Intelligence, vol. 109, 2022
8. Bakalakos S., **Kalogeris I.**, Papadopoulos V., Papadrakakis M., Maroulas P., Dragatogiannis D.A., Charitidis C.A., *An integrated XFEM modeling with experimental measurements for optimizing thermal conductivity in carbon nanotube reinforced polyethylene*, Modelling and Simulation in Materials Science and Engineering, 2022
9. Lu X., Yvonnet J., Papadopoulos L., **Kalogeris I.**, Papadopoulos V., *A stochastic FE^2 data-driven method for nonlinear multiscale modeling*, Materials, vol. 14, 2021

10. Pyrialakos S., **Kalogeris I.**, Sotiropoulos G., Papadopoulos V., *A neural network-aided Bayesian identification framework for multiscale modeling of nanocomposites*, Computer Methods in Applied Mechanics and Engineering, vol. 384, 2021

11. **Kalogeris I.**, Papadopoulos V., *Diffusion maps-aided Neural Networks for the solution of parametrized PDEs*, Computer Methods in Applied Mechanics and Engineering, vol. 376, 2021

12. Bakalakos S., **Kalogeris I.**, Papadopoulos V., *An extended finite element method formulation for modeling multi-phase boundary interactions in steady state heat conduction problems*, Composite Structures, vol. 258, 2021

13. **Kalogeris I.**, Papadopoulos V., *Diffusion maps-based surrogate modeling: An alternative machine learning approach*, International Journal of Numerical Methods in Engineering, vol. 121, pp. 602-620, 2020

14. Papadopoulos V., **Kalogeris I.**, Giovanis D., *A spectral stochastic formulation for nonlinear framed structures*, Probabilistic Engineering Mechanics, vol. 55, pp. 90-101, 2019

15. **Kalogeris I.**, Papadopoulos V., *Limit analysis of stochastic structures in the framework of the probability Density Evolution Method*, Engineering Structures, vol. 160, pp. 304-313, 2018

16. Papadopoulos V., **Kalogeris I.**, *A Galerkin-based formulation of the probability density evolution method for general stochastic finite element systems*, Computational Mechanics, vol. 57, pp. 701-716, 2016

SELECTED CONFERENCE PRESENTATIONS

1. **Kalogeris I.**,Nikolopoulos S., Stavroulakis G., Papadopoulos V., *AI-SOLVE: Fusing linear algebra with machine learning to accelerate the solution of large-scale parametrized systems*, 17th U.S. National Congress on Computational Mechanics, Albuquerque, New Mexico, USA, 23-27 July 2023

2. **Kalogeris I.**,Pyrialakos S., Papadopoulos V., *Multiscale analysis of structures composed of composite materials using a hierarchy of deep neural networks*, 17th U.S. National Congress on Computational Mechanics, Albuquerque, New Mexico, USA, 23-27 July 2023

3. Nikolopoulos S., **Kalogeris I.**, Papadopoulos V., *Machine learning accelerated dynamic analysis of stochastic nonlinear structures*, ECCOMAS Congress, Oslo, Norway, 5-9 July 2022

4. Pyrialakos S., **Kalogeris I.**, Papadopoulos V., *A FE^4 multiscale scheme for CNT-reinforced concrete accelerated by deep neural networks*, ECCOMAS Congress, Oslo, Norway, 5-9 July 2022

5. **Kalogeris I.**, Pyrialakos S., Bakalakos S., Kokkinos O., Papadopoulos V., *Machine learning-assisted stochastic optimization of structures comprised of nano-reinforced concrete*, International Congress on Computational Mechanics organized by the Greek Association of Computational Mechanics (10^{th} GRACM), Virtual Congress, 5-7 July 2021

6. Pyrialakos S., **Kalogeris I.**, Sotiropoulos G., Papadopoulos V., *Bayesian Inference on Multiscale Models of Carbon-Reinforced Polymers accelerated by Deep Neural Networks*, Engineering Mechanics Institute Conference (EMI), Virtual Congress, 25-28 May 2021

7. Nikolopoulos S., **Kalogeris I.**, Papadopoulos V., *An autoencoder-based surrogate modeling approach for parametrized time-dependent PDEs*, 14th World Conference on Computational Mechanics (WCCM XIV) and 8th European Congress on Computational Methods in Applied Sciences and Engineering (ECCOMAS 2020), joint Virtual Congress, 11-15 January 2021

8. Pyrialakos S., **Kalogeris I.**, Papadopoulos V., *A Bayesian identification framework for multiscale analysis of nanocomposites*, 14th World Conference on Computational Mechanics (WCCM XIV)

and 8th European Congress on Computational Methods in Applied Sciences and Engineering (ECCOMAS 2020), joint Virtual Congress, 11-15 January 2021

9. Nikolopoulos S., **Kalogeris I.**, Papadopoulos V., *A machine learning approach for parametric time-history analysis*, XI International Conference on Structural Dynamics (EURODYN 2020), Athens, Greece, 23-26 November 2020
10. **Kalogeris I.**, Papadopoulos V., *A Diffusion Maps-based surrogate model for uncertainty quantification*, 3nd International Conference on Uncertainty Quantification in computational science and engineering (UNCECOMP), Hersonissos, Crete, Greece, 24-26 June 2019
11. Papadopoulos V., **Kalogeris I.**, Ibraimakis M., Giovanis D., *Consistent Bayesian update for multiscale analysis using subset simulation*, 13th World Congress on Computational Mechanics (WCCM), New York, USA, 22-28 July 2018
12. **Kalogeris I.**, Papadopoulos V., Giovanis D., *A spectral stochastic finite element formulation for nonlinear analysis of stochastic structures*, 8th Conference on Computational Stochastic Mechanics (CSM), Paros, Greece, 11-13 June 2018
13. Papadopoulos V., **Kalogeris I.**, Giovanis D., *An SSFEM formulation for the stochastic analysis of nonlinear framed structures*, 2nd International Conference on Uncertainty Quantification in computational science and engineering (UNCECOMP), Rhodes, Greece, 15-17 June 2017
14. **Kalogeris I.**, Papadopoulos V. *Probability Density Evolution Method for buckling analysis of stochastic systems*, 7th European Congress on Computational Methods in Applied Sciences and Engineering (ECCOMAS 2016), Crete, Greece, 5-10 June 2016
15. Papadopoulos V., **Kalogeris I.**, *A Streamline Upwind/Petrov-Galerkin solution of the Probability Density Evolution Method for static systems*, Symposium on Reliability of Engineering System (SRES), Hangzhou, Shanghai, China, 15-17 October 2015

TEACHING EXPERIENCE

- Contract lecturer in University of Thessaly (UTH), Department of Civil Engineering
  Courses: **Finite Element Methods** (1 semester),**Structural Dynamics I** (1 semester), **Structural Dynamics II** (1 semester)
- Teaching assistant in National Technical University of Athens (NTUA), School of Civil Engineering
  Courses: **Stochastic finite elements** (graduate course - 5 semesters), **Data-driven models in Engineering Applications** (graduate course - 2 semesters), **Computer-aided Analysis and Design of Structures** (2 semesters), **Advanced topics in Finite Element Analysis** (1 semester), **Static Analysis of Structures** (1 semester)
- Teaching assistant in School of Pedagogical and Technological Education (ASPAITE), Department of Civil Engineering
  Course: **Probabilistic Analysis and Reliability Analysis of structures** (graduate course)

PARTICIPATION IN RESEARCH PROJECTS

*Data driven computational mechanics at exascale (**DCoMEX**)*, under the call H2020-JTIEuroHPC-2019-1, Budget: 3.000.000 Euros, project's duration 3 years (Participation: 1/10/2021-to date)

Design of Hyperconcrete reinforced with nanomaterials, Supporting Researchers of the Operational Program 'Education and Lifelong Learning', National Ministry of Development and Investments, Budget: 45.000 Euros, project's duration 15 months (Participation: 1/6/2020-31/8/2021)

Optimal multiscale design of innovative materials for heat exchange applications, (HEAT-68/1286), European Regional Development Fund and Greek national Funds through the Operational Program Competitiveness, Entrepreneurship and Innovation, under the call Research-Create-Innovate, Budget: 800.000 Euros, project's duration 3 years (Participation: 10/12/2018-31/12/2019)

Analysis and Performance-based design of structures comprised of composite materials, Research projects for Excellency, IKY/SIEMENS, Budget: 50.000 Euros, project's duration 2 years (Participation: 1/9/2015-31/8/2017)

Mastering the computational challenges in numerical modeling and optimum design of CNT reinforced composites, (**MASTER**), European Research Council Advanced Grant. Budget: 2.500.000 Euros, project's duration 5 years (Participation: 1/10/2014-28/2/2018)

MEMBERSHIPS

- Member of the Technical Chamber of Greece 2012-to date
- Member of the Greek Association of Computational Mechanics 2021-to date
- Member of the ECCOMAS Young Investigators Committee 2022-to date

REVIEWER IN JOURNALS

- Computer Methods in Applied Mechanics and Engineering
- Probabilistic Engineering Mechanics
- Reliability Engineering and System Safety
- Computers & Mathematics with Applications
- Communications in Nonlinear Science and Numerical Simulation

AWARDS & DISTINCTIONS

- Awarded by the Greek Association of Computational Mechanics for the best phd thesis in Greece. in the field of computational mechanics for the year 2020