Dimitrios Tsapetis

CONTACT INFORMATION

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EDUCATION

National Technical University of Athens, GR

Ph.D. in Computational Mechanics
Modeling of structures using Isogeometric Analysis method.
Advisor: Emeritus Professor Manolis Papadrakakis
M.Sc. in Computational Mechanics, 2016
Implementation of subdomain method in Isogeometric Analysis.
Advisor: Professor Manolis Papadrakakis
Dipl. in Civil Engineering, 2014
Isogeometric static analysis with T-Splines.
Advisor: Professor Manolis Papadrakakis

RESEARCH INTERESTS

- **Uncertainty quantification:** Investigation of uncertainty sources in computational models by Bayesian inference of their parameters and assessment of its robustness to changes with the aid of Sensitivity analysis. Utilization of data-driven surrogate models to substitute resource intensive models and experiments.
- **Isogeometric Analysis:** analysis of 2D and 3D structures of complex geometry, by utilizing CAD shape functions such as B-Splines, NURBS and T-Splines, analysis of structures utilizing both the strong (Galerkin) and weak form (Collocation) of the partial differential equation
- **Domain Decomposition Methods:** code development and solution of linear systems by utilizing primal and dual domain decomposition methods in order to reduce the computational cost and increase the scalability of solution techniques in parallel computing environments
- **Structural mechanics:** code development and simulation of structures using beam/plates/shell elements.
- **Stochastic FEM:** simulation of geometric and material uncertainties of structures utilizing stochastic processes

RESEARCH EXPERIENCE

- **The Johns Hopkins University** (2021-present)
  Postdoctoral Research Fellow
- **National Technical University of Athens** (2016-2020)
  Graduate Research Assistant
- **National Technical University of Athens** (2014-2016)
  Graduate Research Assistant
- **National Technical University of Athens** (2012-2014)
  Under-graduate Research Assistant.

Publications

1. **D. Tsapetis**, G. Stavroulakis, M. Papadrakakis. *Domain Decomposition Solution Schemes for isogeometric Collocation Methods*, Computer Methods in Applied Mechanics and Engineering, (*under review*), 2021.
2. **D. Tsapetis**, G. Sotiropoulos, G. Stavroulakis, V. Papadopoulos, M. Papadrakakis. *A stochastic multiscale formulation for isogeometric composite Kirchhoff-Love shells*, Computer Methods in Applied Mechanics and Engineering 373, 113541, 2021.
3. G. Stavroulakis, **D. Tsapetis**, M. Papadrakakis. *Non-overlapping domain decomposition solution schemes for structural mechanics isogeometric analysis*, Computer Methods in Applied Mechanics and Engineering 341, 695-717, 2018.

Conference Presentations

1. *Algorithms of enhanced computational efficiency for solving computational mechanics problems using isogeometric analysis*, HOFEIM VIII, Pavia 2019, Italy.
2. *Solution of isogeometric stochastic problems using domain decomposition*, UNCECOMP II, Rhodes 2017, Greece.
3. *Extending domain decomposition solution schemes for large scale isogeometric simulations*, IGA V, Pavia 2017, Italy.
4. *Domain decomposition solution schemes for large-scale isogeometric analysis problems*, ECCOMAS VII, Crete 2016, Greece.

Computer Skills

Programming Languages:
C#, MATLAB, Java, FORTRAN, Python

Cloud, DevOps, CI/CD:
Azure DevOps, SonarQube, AppVeyor, Nuget, PyPA, Conda packages, Docker

Computer Programs:
ABAQUS, ANSYS, ADINA, STRAD, Sofistik, AutoCAD, Rhinoceros

Software Development

Lead developer @ MSolve: Open source numerical solver for computational mechanics problems, `https://github.com/mgroupntua/`

- Development and maintenance of code features. (FEM, IGA, Domain Decomposition etc.)
- Incorporation of Devops operations to the team workflow. (Continuous Integration - **Azure Pipelines** Code Quality Analysis - **SonarQube** Automatic versioning and nuget package generation)
- Integration with commercial (**Ansys**) and academic software (**UQpy**).
- Proficient user of git version control system and web version control services (**Github, Bitbucket**).

Lead developer @ UQpy: Uncertainty quantification Python Toolbox for modeling uncertainty in physical and mathematical systems, `https://github.com/SURGroup/UQpy`

- Development and maintenance of code features.
- Incorporation of DevOps operations to the team workflow. (Continuous Integration - **Azure Pipelines** Code Quality Analysis - **SonarQube** Automatic versioning and distribution of Python packages - **PyPA, Conda-forge** Automatic generation and distribution of **Docker** images)

Teaching Experience

National Technical University of Athens (2019-present)
Teaching Assistant
Finite Element Analysis of Structures, School of Civil Engineering

Working Experience

Freelance Civil Engineer (2014-2017)

- Structural analysis and design of concrete buildings.
- Topographic and building blueprints.
- Energy performance certificates

Software developer (2017-2020)

- Development of Xamarin Forms and Xamarin Native mobile applications (iOS, Android).
- Development of desktop applications with WPF/UWP technologies.
- Cooperation with UI/UX designers via vector-based web tools (Abobe XD, Figma)

Postdoctoral Research Fellow (2021-present)

- Investigate and quantify uncertainty of material behavior in extreme environmental conditions based on experimental data and existing computational models.
- Maintenance and development of in-house uncertainty quantification code base.

Professional Qualifications

- Licensed Civil Engineer in Greece
- Member, Technical Chamber of Greece (TEE)