Filippos Filippitzis

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Education

Sept. 2016 – Dec. 2020	Ph.D., Department of Mechanical and Civil Engineering, **California Institute of Technology** (GPA 4.1).
Sept. 2016 – June 2018	Master of Science in Mechanical Engineering, **California Institute of Technology** (GPA 4.1).
Sept. 2011 – July 2016	Diploma in Mechanical Engineering, **University of Thessaly** (GPA 9.23/10), Ranked 1st.

Current Employment

Sept. 2022 – Present

Altair Engineering. Software Development Engineer.

- Designed and implemented mesh and geometry algorithms for the HyperMesh FEA preprocessing solution.
- Worked with and collaborated with a team of 35 engineers, developers, and product managers.
- Among other projects, succeeded in optimizing the performance of the mesh rebuild tool, with up to 90% performance gain for larger (number of elements) models.

Work / Research Experience

Aug. 2022	**University of Thessaly.** Postdoctoral researcher in the System Dynamics Laboratory. Optimal sensor placement for response reconstruction and monitoring of structures.
Nov. 2021 – Aug. 2022	**Hellenic Air Force.** Military Service at the 111th Combat Wing, Nea Aghialos Air Base, Greece. Network administration and maintenance, IT and Helpdesk service.
Oct. 2021	**University of Thessaly.** Postdoctoral researcher in the System Dynamics Laboratory. Monitoring and response reconstruction in bridges using on-board measurements from passing trains.
Aug. 2014 – Sept. 2014	**ETH Zurich.** Internship in the Computational Science and Engineering Laboratory. Exploring Bayesian inversion methods for parameter estimation of models of objects falling in a medium.

Teaching Experience

Mar. – July 2021	**University of Western Macedonia**, Department of Mechanical Engineering. **Lecturer**. Graduate Course *Stress Analysis Methods: Theory, Simulation, Experiment (ADMES23)*, part of the graduate studies program in "Advanced Engineering of Energy Systems" (ADVENS).
Winter 2019	**California Institute of Technology**, Department of Mechanical and Civil Engineering. Teaching Assistant (TA). *Mechanics of Structures and Solids (Ae/AM/CE/ME 102B)*. TA to professor John Hall.
Winter 2018	**California Institute of Technology**, Department of Mechanical and Civil Engineering. Teaching Assistant. *Experiments and Modeling in Mechanical Engineering (ME 050A)*. TA to instructor Dr. Michael Mello.

Research Areas

Structural Health Monitoring; Digital Twins; Finite Element Modeling; Parameter estimation; Bayesian Learning; Structural dynamics; Virtual Sensing; Optimal Sensor Placement; Earthquake ground motion response; Earthquake data processing, analysis, and visualization; Local site characterization.

Technical Skills – Finite Element Modeling

- HyperMesh – HyperView (Altair Engineering)
- ANSA – META (Beta CAE),
- Ansys Mechanical, Ansys CFD (ANSYS)
- SAP2000, ETABS (CSI),
- OpenSees (UC Berkeley – Open source)

Technical Skills – Programming Languages

- C++ (HyperMesh Development)
- MATLAB
- Fortran
- Python
- Html/CSS/JavaScript

Technical Skills – Other

- Computer-aided design (AutoCAD)
- Version control (Git, Perforce)
- Document authoring (Microsoft Office, LaTeX)

Selected Honours/Awards

2017-2020	The Cecil and Sally Drinkward Graduate Fellowship, Department of Mechanical and Civil Engineering, California Institute of Technology.
2016-2017	The Allan Acosta Endowed Graduate Fellowship, Department of Mechanical and Civil Engineering, California Institute of Technology.
2011-2016	State Scholarships Foundation (IKY) Fellowship and award received for 5 years, for ranking 1st during my studies in the Mechanical Engineering Department, University of Thessaly.
Sept. 2011	State Scholarships Foundation (IKY) Fellowship and award for high ranking during the National - Panhellenic Examination for admission to Greek Universities.
Sept. 2011	Eurobank Fellowship – Award for ranking first in his Lyceum - Senior High School.

Memberships and Affiliations

- Earthquake Engineering Research Institute (EERI)
- Seismological Society of America (SSA)
- Technical Chamber of Greece (TEE)

Publications

Journal

[J1] Siu, H.M., **Filippitzis, F.**, Stoura, C.D., Papadimitriou, C., and Dimitrakopoulos, E.G., 2024. "Utilizing On-board Sensing of Passing Train Vehicles for Virtual Sensing of Bridges." *Engineering Structures. DOI: 10.1016/j.engstruct.2024.118808.*

[J2] **Filippitzis, F.**, Kohler, M.D., Heaton, T.H., and Beck J.L., "Sparse Bayesian Learning for Damage Identification using Nonlinear Models: Application in Weld Fractures of Steel-Frame Buildings." *Structural Control and Health Monitoring. DOI: 10.1002/stc.2870.*

[J3] **Filippitzis, F.**, Kohler, M.D., Heaton, T.H., W. Graves, R.W., Clayton, R.W., Guy, G., Bunn, J.J., and Chandy, K.M., 2021. "Ground Motion Response in Urban Los Angeles from the 2019 Ridgecrest Earthquake Sequence." *Earthquake Spectra. DOI: 10.1177/87552930211003916.*

[J4] Kohler, M.D., **Filippitzis, F.**, Heaton, T.H., R.W., Clayton, R.W., Guy, G., Bunn, J.J., and Chandy, K.M., 2020. "2019 Ridgecrest Earthquake Reveals Areas of Los Angeles That Amplify Shaking of High-Rises." *Seismological Research Letters. DOI: 10.1785/0220200170.*

[J5] **Filippitzis, F.**, Gourgoulianis, K., Daniil, Z. and Bontozoglou, V., 2020. "The Effect of Alveolar Mixing on Particle Retention and Deposition Investigated by a Dynamic Single-Path Model." *Aerosol Science and Technology. DOI: 10.1080/02786826.2020.1759775.*

Conference Proceedings

[C1] **Filippitzis, F.**, Siu, H.M., Stoura, C.D., Papadimitriou, C., and Dimitrakopoulos, E.G., 2023. "Response Reconstruction in Bridges Using On-board Measurements from Passing Vehicles." *5th ECCOMAS Thematic Conference on Uncertainty Quantification in Computational Science and Engineering (UNCECOMP 2023), ECCOMAS Proceedia. DOI: 10.7712/120223.10322.20017.* ***Proceedings paper****.*

[C2] Kohler, M.D., **Filippitzis, F.**, Graves, R.W., Massari, A.T., Heaton, T.H., Clayton, R.W., Bunn, J.J., Guy, R., and Chandy, K.M., 2022. "Variations in Ground Motion Amplification in the Los Angeles Basin due to the 2019 M7.1 Ridgecrest Earthquake: Implications for the Long-Period Response of Infrastructure." *ASCE Lifelines 2022. DOI: 10.1061/9780784484449.020.* ***Proceedings paper****.*

[C3] Ercan, T., **Filippitzis, F.**, and Papadimitriou, C., 2022. "Optimal Design of Sensor Networks for Monitoring of Structures." 5th Hellenic Conference on Earthquake Engineering and Engineering Seismology (HAEE/ETAM), 20-22 Oct. 2022, Athens, Greece. ***Proceedings paper****.*

[C4] **Filippitzis, F.**, Kohler, M.D., Massari, A.T., Roh, B., and Heaton, T.H., 2021. "Spectral Scaling Transfer Function Method for Scenario Ground Motion Simulation with Application to the 2019 Ridgecrest Earthquake Sequence." *2021 SCEC Annual Meeting.* ***Poster Presentation****.*

[C5] Kohler, M.D., Massari, A.T., **Filippitzis, F.**, Heaton, T.H., and Roh, B., 2021. "Spectral Scaling Transfer Function Method for Scenario Ground Motion Simulation with Application to the 2019 Ridgecrest Earthquake Sequence." *2021 AGU Fall Meeting.* ***Abstract****.*

[C6] **Filippitzis, F.**, Kohler, M.D., Heaton, T.H., Graves, R.W., Clayton, R.W., Guy, R., Bunn, J.J., and Chandy, K.M., 2020. "High-Resolution Site Response Study of the Los Angeles Basin from the 2019 Ridgecrest Earthquake Sequence." 2021 *SSA Annual Meeting.* ***Abstract and Oral Presentation****.*

[C7] **Filippitzis, F.**, Kohler, M.D., Heaton, T.H., Graves, R.W., Clayton, R.W., Guy, R., Bunn, J.J., and Chandy, K.M., 2020. "Ground Motion in Urban Los Angeles from the 2019 Ridgecrest Earthquakes: Recorded Versus Model-Predicted Response." 2020 *AGU Fall Meeting.* ***Abstract and Oral Presentation****.*

[C8] **Filippitzis, F.**, Kohler, M.D., Heaton, T.H., Graves, R.W., Clayton, R.W., Guy, R., Bunn, J.J., and Chandy, K.M., 2020. "Ground Motion Response Study of Urban Los Angeles following the 2019 Ridgecrest Earthquake Sequence." *2020 SCEC Annual Meeting.* ***Poster Presentation****.*

[C9] **Filippitzis, F.**, Kohler, M.D., Heaton, T.H., 2019. "Identification of Sparse Damage in Steel-Frame Buildings Using Dense Seismic Array Measurements." *Structural Health Monitoring 2019. Proceedings of the 12th IWSHM, Stanford. DOI: 10.12783/shm2019/32398*. ***Proceedings paper and Oral Presentation****.*

[C10] **Filippitzis, F.**, Kohler, M.D., Heaton, T.H., 2019. "Identification of Sparse Damage in Steel Buildings using Community Seismic Network." *ASCE-EMI (*Engineering Mechanics Institute*) 2019 Conference, Caltech.* ***Abstract and Oral Presentation****.*

[C11] **Filippitzis, F.**, Kohler, M.D., Clayton, R.W., Bunn, J.J., Guy, G., Heaton, T.H., and Chandy, K.M., 2018. "Low-cost Seismic Monitoring: The Community Seismic Network." *2018 Geomechanics and Mitigation of Geohazards Fall Meeting (GMG 2018).* ***Poster Presentation****.*

Theses

[T1] **Filippitzis, F.**, 2020. "Identification of Structural Damage, Ground Motion Response, and the Benefits of Dense Seismic Instrumentation." ***Doctoral Dissertation.*** *California Institute of Technology, Pasadena, USA. (defended 30 September 2020)*

[T2] **Filippitzis, F.**, 2016. "An Euler Model for Particle Transport and Deposition in Pulmonary Flows." ***Diploma Thesis.*** *University of Thessaly, Greece*.

Reviewer for Journals:

- "Structural Control and Health Monitoring", published by Wiley (5 papers).

Relevant Coursework at Caltech

ACM 100 AB:	Introductory Methods of Applied Mathematics for the Physical Sciences
ACM 104:	Applied Linear Algebra
ACM/EE 106AB:	Introductory Methods of Computational Mathematics
AM/CE 151AB:	Dynamics and Vibrations
CDS 110:	Introduction to Feedback Control Systems
CDS 131:	Linear Systems Theory

Coursework at Caltech

Ae/AM/CE/ME 102ABC:	Mechanics of Structures and Solids
Ae/AM/ME 223:	Plasticity
Ae/CE 165A:	Mechanics of Composite Materials and Structures
ME/Ge/Ae 266AB:	Dynamic Fracture and Frictional Faulting
CS/CNS/EE 156A:	Learning Systems

Relevant Coursework at UTH

ΓΕ0103:	Ordinary Differential Equations
ΓΕ0104:	Partial Differential Equations
ΓΕ0105:	Numerical Methods
MY1400:	Control Systems Engineering