Aditi Kumawat

N1155, Arcisstrasse 21 – Munich 80333, Germany

Professional Experience

Technical University of Munich — **Munich, Germany**
Postdoctoral Researcher — *2021–2023*

- **Analysis of induced geothermal events in Germany**
  - Performed structural analysis of buildings near geothermal sites using ANSYS
  - Data-driven model updating of the frequency response functions of the building model
- **Surrogate modelling for building taxonomy**
  - Generated scenario-based artificial ground motions using a stochastic simulator
  - Implemented stochastic polynomial chaos expansion for building models
- **Synthetic ground motion generation for geothermally induced seismicity**
  - Developed a physics-based ground motion model for source-wavefield simulation

Technical University of Munich — **Munich, Germany**
Guest Scientist — *2020–2021*

- **Building response under induced seismicity**
  - Modeled structural behavior under ground vibrations using analytical approach
  - Validated the results using experimental data

University of Stuttgart — **Stuttgart, Germany**
Guest Scientist — *2019–2020*

- **Simulation and modelling of railway track defects**
  - Proposed an iterative technique to evaluate time-dependent loads on track structure
  - Analyzed the impact of rail/track defects on track health using the proposed approach

Indian Institute of Technology Kanpur — **Kanpur, India**
PhD Candidate — *2015–2021*

- **Wave propagation characterization of track behaviour**
  - Proposed a method to assess the impact of soil waves on railway track behavior
  - Tested validity of two track models based on train velocity and subgrade parameters.
- **Computational model for ballasted railway track systems**
  - Proposed a model incorporating all essential substructural track components
  - Validated the model using experimental data for track accelerations
- **Evaluation of Green's function for the railway track**
  - Formulated a wave-number based approach to obtain track's impulse response function

Education

Indian Institute of Technology Kanpur — **Kanpur, India**
PhD — *2015–2021*

- Thesis Topic: *Ballasted Railway Track Systems: A New Analytical Framework for Modelling and Simulation*

MBM Engineering College — **Jodhpur, India**
B.E. (Civil Engineering) — *2009–2013*

- Graduated with *First Class Honors*

Open Source

FreqTrack *2024*
- Modelling framework for ballasted railway track system

TaxoSim *2023*
- Ansys-MATLAB framework for developing and analyzi ng building taxonomy

WaveSim *2023*
- Code for generating ground motion for given soil-profile

Teaching Experience

Technical University of Munich **Munich, Germany**
Tutorial/Lecture Sessions *2020-2023*
- Structure Dynamics
- Integral Transform Methods
- Soil Vibrations: Emission, Propagation, Immission, Abatement
- Modelling and Simulation in Structural Mechanics

Computer skills

	Level	Skill	Years	Comment
Language	■■■■■	MATLAB	10	*Integral to all phases of my research work*
	■■■■■	Python	4	*Used for data analysis in multiple projects*
Application	■■■■■	Ansys	5	*Used as FEM modelling tool for dynamic analysis of structures*
	■■■■■	Origin	2	*Used as data visualization tool*
	■■■■■	AutoCad	2	*Gained instructional experience as a tutor*

Spoken Languages

English: Advanced (C2)

German: Intermediate (B1)

Hindi: Advanced (Native)

French: Beginner (A1)

Awards

2023: Secured funding for a co-authored project proposal on data-driven model updating to enhance seismic safety of buildings

2018: 'Best Presenter Award' for the paper presented IGC-2018, India

2015-2020: Graduate Scholarship, Ministry of Human Resource Development, India

Selected Publications

[1] **Kumawat, A.**, F. Taddei, W.T. Kao, and G. Müller. Impact of geothermal micro-seismic events on the serviceability and comfort of urban structures. *to be submitted*, September 2024.

[2] **Kumawat, A.**, S. Keil, F. Taddei, and G. Müller. Generation of synthetic ground motions for geothermally induced earthquakes. In *18th World Conference on Earthquake Engineering (WCEE)*, 2024.

[3] F. Taddei, S. Keil, **Kumawat, A.**, and G. Müller. Comparison between ground motion data and semi-empirical spectral ground motion prediction equations for geothermal-induced micro-earthquakes. In *18th World Conference on Earthquake Engineering (WCEE)*, 2024.

[4] F. Taddei, S. Keil, A. Khansefid, **Kumawat, A.**, F. Schneider, J. Wassermann, and G. Müller. Development and use of semi-empirical spectral ground motion models for gpp-induced micro-earthquakes in southern germany. *Bulletin of Earthquake Engineering*, pages 1–48, 2024.

[5] **Kumawat, A.**, F. Taddei, and G. Müller. An iterative approach for analyzing wheel-rail interaction. In *International Conference on Wave Mechanics and Vibrations*, pages 567–580. Springer International Publishing, 2022.

[6] **Kumawat, A.**, F. Taddei, A. Csuka, R. Cudmani, and G. Müller. Response analysis of low-rise buildings under micro seismic events induced by geothermal operations. In *International Conference on Noise and Vibration Engineering (ISMA)*, 2022.

[7] F. Taddei, **Kumawat, A.**, A. Csuka, R. Cudmani, and G. Müller. Input characterisation for low-amplitude seismicity induced by geothermal operations. In *International Conference on Noise and Vibration Engineering (ISMA)*, 2022.

[8] A. Csuka, **Kumawat, A.**, F. Taddei, R. Cudmani, and G. Müller. Deep geothermal power plants: Soil-structure interaction under micro-seismic events. In *Geo-Congress 2022*. American Society of Civil Engineers, 2022.

[9] **Kumawat, A.**, U. Martin, S. Bahamon, and S. Rapp. The influence of local irregularities on the vehicle-track interaction. In *Advances in Transportation Geotechnics IV*, Lecture Notes in Civil Engineering. Springer, 2021.

[10] **Kumawat, A.**, P. Raychowdhury, and S. Chandra. Frequency-dependent analytical model for ballasted rail-track systems subjected to moving load. *International Journal of Geomechanics*, 2019.

[11] **Kumawat, A.**, P. Raychowdhury, and S. Chandra. A wave number based approach for the evaluation of the green's function of a one-dimensional railway track model. *European Journal of Mechanics - A/Solids*, 2019.

[12] **Kumawat, A.**, P. Raychowdhury, and S. Chandra. Investigation of the inertial characteristics of the railway track system. In *Geotechnical Characterization and Modelling*. Springer, 2018. Proceedings of Indian Geotechnical Conference.