



## Dr VIJAYA RAMANATHAN

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<https://scholar.google.com/citations?user=eejmBNsAAAAJ&hl=en>

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### Earned Degrees

<b>Doctor of Philosophy, Geotechnical Engineering</b> Indian Institute of Technology Madras, Chennai, India Thesis: 3D and 2D numerical modelling of seismic response of basins	2021
<b>Master of Technology, Soil Mechanics &amp; Foundation Engineering</b> S V National Institute of Technology, Surat, India Project: Soil Structure Interaction of soft storey buildings	2014 (9.37/10)
<b>Bachelor of Engineering, Civil Engineering</b> A C College of Engineering & Technology, Karaikudi (Anna University), India Project: Design of optimum mix for hollow concrete blocks using flyash & quarry dust	2012 (8.78/10)

### Achievements & Awards

- Anna University 19th **Rank Holder** in BE Civil Engineering.
- Won **Best All-Round Outgoing Student Award** (ACCET, Anna University, 2012).
- Won **Special Jury award** in students project competition on the topic “Design of Blast resistant structures using Staad Pro” held at ACCET, Anna University.
- Qualified Graduate Aptitude Test in Engineering (GATE 2012) and availed scholarship for PG program.
- Ranked 66 in Nationwide Education and Scholarship Test (NEST 2012).
- Awarded Half Time Research Assistantship as scholarship by Ministry of Human Resource Development, Govt. of India, to pursue Doctoral studies in Civil Engineering.

### Publications

#### *Journals:*

1. **Vijaya, R.**, and Boominathan, A. (2021) “Modelling the 2D Seismic response of Kutch basin in Indian Subcontinent.” *Soil Dynamics and Earthquake Engineering*, 152 (January 2022) 107014. **Elsevier**. <https://doi.org/10.1016/j.soildyn.2021.107014>.
2. Rama Rao, G. V., Sunil, J. C., and **Vijaya, R.** (2021) “Soil Structure Interaction effects on seismic response of soft storey buildings.” *Sadhana*, 46, 105. **Springer**. <https://doi.org/10.1007/s12046-021-01633-0>.
3. **Vijaya, R.**, Boominathan, A., and Mazzieri, I. (2020). “3D Ground response analysis of simplified Kutch basin by spectral element method.” *Journal of Earthquake and Tsunami*, 14(1), 2050003, **World Scientific**. <https://doi.org/10.1142/S1793431120500037>.

### ***Under preparation and internal review (To be submitted within 3 months):***

4. **Vijaya, R.**, and Boominathan, A. “Development of basin factors for ground motion amplitude by multiple variable non-linear regression analysis.”
5. **Vijaya, R.**, and Boominathan, A. “Comparison of 2D and 1D basin response and Development of basin aggravation factors for spectral ordinates.”
6. **Vijaya, R.**, Senthin, Amudan, M., and Subhadeep Banerjee. “Effect of multi stage triaxial testing on the dynamic properties of silty sand.”
7. Deviprasad, B. S., Krishna, Chaitanya, C., Tanwee, Mazumder., **Vijaya, R.**, Sriram, Karthick, Raja, P., Neeraj, Pulaganti., Subhadeep Banerjee., and Ramesh, Kannan, Kandasami. “Deterministic and Probabilistic assesment of liquefaction susceptibility: A comparison”

### ***Book Chapters:***

1. **Vijaya, R.**, Boominathan, A., Mandal, P., and Mazzieri, I. (2019). “Numerical analysis of three-dimensional basin effects in the Kutch basin, India” in the book “*Earthquake Geotechnical Engineering for Protection and Development of Environment and Constructions - Proceedings of 7th International Conference on Earthquake Geotechnical Engineering*”, Editors: Silvestri & Moraci, 5531- 5538, CRC Press, ISBN: 978-036714328-2.
2. Boominathan, A., Krishna, Kumar., and **Vijaya, R.** (2018). “Site-Specific Ground motion studies for a deep soil site near Ahmedabad, Gujarat” in the book “*Recent challenges and Advances in Geotechnical Earthquake Engineering*”, Editors: T. G. Sitharam and J. S. Vinod, (Chapter 2), IGI Global. ISBN: 9781522569480

### ***Conferences:***

1. **Vijaya, R.**, Boominathan, A., Mandal, P., and Mazzieri, I. (2018). “Seismic wave amplification studies considering 3D basin effect by Spectral Element Method.” Proceedings of 16th Symposium on Earthquake Engineering, Roorkee, India.
2. **Vijaya, R.**, Boominathan, A., and Mandal, P. (2017). “Seismic wave amplification studies for shallow basins considering basin edge effect.” Proceedings of 3rd International Conference on Performance based design in Earthquake Geotechnical Engineering, Vancouver, Canada.
3. **Vijaya, R.**, Rama Rao, G. V., Gopalakrishnan, N. and Solanki, C. H., “Soil Structure Interaction studies on soft storey buildings”, Indian Engineering Congress, Chennai (2013).

### **Collaborations**

- Politecnico di Milano, Milan, Italy (PhD Research)

Collaborated with Dr. Ilario Mazzieri (Asst. Prof.), on high-performance computation and parallel programming for simulation of seismic wave propagation in huge domains.

- National Geophysical Research Institute - CSIR, Hyderabad (PhD Research)

Collaborated with Dr. Prantik Mandal (Principal Scientist) on geophysical studies and strong motion instrumentation of Kutch basin, Gujarat, India.

- Structural Engineering Research Centre - CSIR, Chennai (MTech Project)

Collaborated with Dr. G. V. Rama Rao (Senior Scientist) in the Advanced Seismic Testing and Research Laboratory on soil structure interaction. Part of the project work was collaborated with Dr. N. Gopalakrishnan (Currently, Director at CBRI – CSIR, Roorkee) on shear wall soil interaction.

## Teaching Experience

- 1. Freelance Teacher** at E-learning platform SKILL LYNC *March 2021 – Present*  
Creating a course on *Design of Machine Foundations*
- 2. Half-time Teaching & Research Assistant (HTRA)** at IIT Madras *July 2015 – Dec 2019*  
Taught and Evaluated Assignments and Examinations for the PG/PhD level theory courses *Soil Dynamics* (Odd semester) and *Ground Improvement Technique* (Even semester)
- 3. Half Time Teaching Assistant (HTTA)** at SVNIT Surat *March 2014 – June 2014*  
Taught *Soil Mechanics Laboratory* (UG) course

## Industrial Experience (during the tenure of PhD)

Assisted in the following projects and drafted reports: (Investigator: Prof. A. Boominathan, IIT Madras)

- 1. Project:** Site Specific Seismic Study for the KG-DWN-SPS+SURF Project, Eastern Offshore, India (*Client:* McDermott International Management S. DE.RL, Chennai)  
**Role:** Carried out desk studies on probabilistic seismic hazard analysis, 1D seismic site response analysis, liquefaction analysis and developed design spectrum for Design basis earthquake and Maximum considered earthquake.
- 2. Project:** Site Specific Geotechnical Seismic Design for Kudankulam Atomic Power Plant (*Client:* BGR Energy Systems Limited, Chennai)  
**Role:** Carried out 1D seismic site response analysis using SHAKE program and developed site specific design spectrum.
- 3. Project:** Geotechnical Investigation for Construction of 8 High Rise Buildings in Moolakothalam, Chennai under Housing for All Scheme (*Client:* Tamil Nadu Slum Clearance Board, Chennai)
- 4. Project:** Geotechnical Investigation at K.P.Park, Chennai for Construction of High Rise Buildings under Housing for All Scheme (*Client:* Tamil Nadu Slum Clearance Board, Chennai)  
**Role in Project 3 and 4:** Carried out geotechnical and geophysical investigation of the site by SPT and advanced MASW test. Arrived at the soil design parameters from the lab tests and SPT N value and designed the foundation.

## Work Experience

- Senior Project Officer, Department of Civil Engineering, IIT Madras, Chennai *Jan 2021- Present*
- Project 1:** Development of methodology of Seismic SSI analysis of combined pile-raft foundation system for nuclear power plant structures (*Client:* Nuclear Power Corporation of India, Government of India)  
**Job Responsibility:** Conducting advanced laboratory experiments such as cyclic triaxial and bender element to determine the dynamic properties of soil; Developing strain dependent modulus reduction and damping curves for soils at different depths.
  - Project 2:** Geotechnical Aspects and Dam Design for Kalpasar Dam Project (*Client:* National Centre for Coastal Research, Ministry of Earth Sciences, Government of India)  
**Job Responsibility:** Site characterisation; Determination of shear strength and compressibility parameters; Liquefaction analysis; Design and analysis of the dam for stability, settlement and seepage under static and dynamic condition; Deriving construction methodology; Proposing ground improvement techniques; Proposing instrumentation for monitoring; Report preparation; PowerPoint presentation for meetings.

**Project 3:** Geotechnical investigation for the development of Machilipatnam port in Krishna district of Andhra Pradesh state (*Client:* Rail India Technical and Economical Services, Ministry of Railways)

**Job Responsibility:** Design and analysis of breakwater for stability and settlement under hydro static condition.

**Reviewed geotechnical reports and assessed the soil design parameters and foundation design for the following projects:**

**Project 4:** General Consultancy for geotechnical design of Mumbai-Ahmedabad High Speed Rail project (*Client:* National High Speed Rail Corporation, Ministry of Railways, Government of India)

**Project 5:** General Consultancy for geotechnical design of the Indore Metro Rail Project (*Client:* Rail Vikas Nigam Limited, Ministry of Railways, Government of India)

**Project 6:** General Consultancy of geotechnical work for proposed JSW cement 3000 TPD clinker line in U.A.E. (*Client:* Arab Centre for Engineering Studies)

**Project 7:** General Consultancy for soil investigation work & geotechnical design of Highrise multiuse Commercial building (*Client:* M/s. Karle Infra Pvt. Ltd. Bangalore, India)

**Project 8:** General Consultancy for geotechnical investigation of proposed construction of Highrise Residential Apartment (*Client:* M/s. Sobha Ltd. Bangalore, India)

### **Proficiency in Software Tools**

Plaxis, Flac2D, Shake, Seismosignal, Abaqus, Sap, Staad Pro, R-Crisis

### **Professional Affiliation**

- Indian Geotechnical Society
- Deep Foundation Institute India
- American Society of Civil Engg (Student Member)

### **Internship**

#### **1. Indian Institute of Technology Madras, Chennai, India**

*May 2013 – July 2013*

Numerical modeling and dynamic analysis of vertical and batter pile foundations subjected to cyclic loading using finite element software ABAQUS

#### **2. Thermal Power Plant, Neyveli Lignite Corporation India Ltd., Neyveli, India**

*Dec 2009*

Industrial Inplant Training for 2 weeks. Learnt the working principles and construction of Thermal Power Plant structures such as Boiler, Cooling Tower and Chimney.

### **International Visits**

#### **1. Canada, Vancouver**

*15 – 24 July, 2017*

**Presented paper** in 3rd International Conference on Performance based design in Earthquake Geotechnical Engineering

Attended a **technical tour** - Geotechnical Engineering in Mountainous Terrain: Opportunities and Hazards.

#### **2. Italy, Rome**

*16 June – 1 July, 2019*

**Presented paper** in 7th International Conference on Earthquake Geotechnical Engineering

Attended a **technical visit** to Amatrice and Norcia site that was hit by the 2016 – 2017 seismic sequence in the central Apennines, one of the most seismically active areas in Italy.

## Co & Extra Curricular Activities

- Won 1st place in **Modelling** and 2nd place in **Technical Quiz** in Govt. Institute of Technology, Vellore (24 – 25 February, 2011, TECHNOCRAT 2K11).
- Won 2nd place in **CADD contest and Staad Pro** competition held at Annamalai university (26 February 2011, STRESS'11).
- **Presented papers in symposiums** at various colleges during Bachelors (2008 - 2012) on topics: “Renewable energy sources”, “Gypcrete rapid wall panel”, “Nanotechnology in Civil Engineering”, “Smart Structures”, “Fiber reinforced concrete”, “Natural Fibers in Concrete”.
- Student member in NSS, Rotaract club, ISTE, CEA, IEL.
- Won many prizes in Quiz, Oratorical Competitions, Debates and Cultural activities.
- Part of Institute Cricket, Football, Basketball team (2012 - 2019).
- National level Athlete and won many **Individual Championship** and **Best Player Award** in Inter-IIT sports meet, Intra-college sports meet and Tamil Nadu school games.
- **National Record Holder** in 100m race (Better meet record at Inter IIT Sports meet 2017).




## Leadership Qualities

- **Student Co-ordinator and Compere** in various National and International Conferences: 8<sup>th</sup> IYGEC (Oct 2021, IIT Madras); DFI India Conference (Oct 2017, IIT Madras); Indian Geotechnical Conference (Dec 2016, IIT Madras); 6th International Geotechnical Symposium (Jan 2015, IIT Madras); Structural Engineering Convention (Dec 2012, NIT Surat); Civil Engineering Symposium (Oct 2011, ACCET, Anna University)
- Tamil Nadu **state captain** for Senior kho-kho team (2006)
- Institute captain for athletics and kho-kho team (2008 - 2019)
- Hostel **sports secretary** at IIT Madras (2016 - 2017)
- Member of **hostel council** and Institute Sports Board at IIT Madras (2016 - 2017)
- General Captain – Sports, ACCET Karaikudi (2011 - 2012)
- Patrol Captain - Scout & Guide; School Pupil Leader (2005)
- Executive Member - Civil Engineering Association, ACCET Karaikudi (2010 - 2012)

## Language Proficiency

- English & Tamil - Read, Write & Speak
- Russian & Hindi - Read & Write

## References

 <b>Prof. A. Boominathan,</b> Professor – Dept. of Civil Engg. Indian Institute of Tech. Madras, Chennai.  <a href="mailto:boomi@faculty.civil.iitm.ac.in">boomi@faculty.civil.iitm.ac.in</a>  98403 78960	<b>Prof. Subhadeep Banerjee,</b> Professor – Dept. of Civil Engg. Indian Institute of Tech. Madras, Chennai. <a href="mailto:subhadeep@civil.iitm.ac.in">subhadeep@civil.iitm.ac.in</a> 98401 32095	<b>Dr. G. V. Rama Rao,</b> Senior Scientist, CSIR – Structural Engineering Research Centre, Chennai. <a href="mailto:ramarao@serc.res.in">ramarao@serc.res.in</a> 94441 66829
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