SHASHANK PATHAK

Academics

Ph.D. (Civil Engineering) Jul 2013—Sep 2019, **CGPA: 9.5/10**
Thesis: Nuclear Explosion Deforms the Ground: How much & How Sure?
Supervisor: Prof. G. V. Ramana
Indian Institute of Technology (IIT) Delhi, New Delhi, India

B.Tech.-M.Tech. (Dual) (Civil Engineering) Jul 2005—Aug 2010, **CPI: 8.7/10(UG), 10/10(PG)**
Thesis: On Nonstationarity-Related Errors in Modal Combination Rules
Supervisor: Prof. V. K. Gupta
Indian Institute of Technology (IIT) Kanpur, U.P., India

Course-work Attended UG and PG levels courses related to structural engineering, structural dynamics, earthquake engineering, geotechnical engineering, and rock engineering with good academic record [Appendix-A]

Professional Experience

Université libre de Bruxelles (ULB), Brussels, Belgium
Post-doctoral researcher in Precision Mechatronics Laboratory (Nov 2019–till date)
Research area: *Active Vibration Control*
Other activities: *A part of Geophysics group in Einstein-Telescope Project*

Central Soil & Materials Research Station, Ministry of Water Resources RD & GR, Govt. of India
Scientist-B (Jun 2012–Jun 2017) & Scientist-C (Jun 2017–Sep 2019)
Research area: *In-situ Rock Mechanics Investigation*

Indian Institute of Technology (IIT) Gandhinagar, Gujarat, India
Assistant Research Professor, Civil Engineering (Nov 2011–Apr 2012)
Course taught: *Engineering Mechanics (ME 104) in Semester-II (2011-12)*

Larsen & Toubro (L&T) Faridabad, Haryana, India
Post-Graduate Engineer Trainee (Aug 2010–Aug 2011) & Senior Engineer (Aug 2011–Oct 2011)
Consulting area: *Structural Design of Bridge Foundations*

Field Experience

Obtained extensive hands-on experience of conducting Uniaxial jacking tests, Hydraulic fracturing tests, Goodman jack tests, and Direct shear tests for in-situ characterization of rock-mass at various hydroelectric project sites in India, Bhutan and Nepal [Appendix-B].

Awards & Honours

Actions de recherche concertées (ARC) Fellowship–2019 by ULB, Belgium

Young Geotechnical Engineer Award–2016 by Indian Geotechnical Society-Delhi Chapter

ISRMTT Best Paper Award–2014 by Indian Society for Rock Mechanics and Tunnelling Technology

Academic Excellence Award–2009 by Indian Institute of Technology (IIT) Kanpur

Academic Excellence Award–2008 by Indian Institute of Technology (IIT) Kanpur

Broad areas of Research Interest

Dynamics, Vibrations, Stochastic and Uncertainty Analysis, Rock Engineering

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Publications

Journal Papers

under review **Pathak, S.**, & Ramana, G. V. (n.d.-b). Nuclear-air-blast-induced ground displacement in super-seismic zone: Magnitude and uncertainty. *Journal of engineering mechanics*.

under review **Pathak, S.**, & Ramana, G. V. (n.d.-c). On stress-strain function of geomaterials subjected to blast-loads. *Géotechnique*.

under review **Pathak, S.**, & Ramana, G. V. (n.d.-a). Inferences for design of nuclear shelters: Revisiting some nuclear test data. *Journal of Structural Engineering*.

in press **Pathak, S.**, & Ramana, G. V. (n.d.-d). Probabilistic characterization of nuclear-blast loads. *Journal of Structural Engineering*.

2019 **Pathak, S.**, & Ramana, G. V. (2019). A first order quantification of effects of uncertainties in hydro-fracturing parameters on tunnel ovalization estimates. *Geotechnical and Geological Engineering*, *37*(4), 3049–3064.

2018 **Pathak, S.**, & Ramana, G. V. (2018a). A designer's approach for estimation of nuclear-air-blast-induced ground motion. *Advances in Civil Engineering*, *2018*, 1–12.

2017 **Pathak, S.**, & Gupta, V. K. (2017). On nonstationarity-related errors in modal combination rules of the response spectrum method. *Journal of Sound and Vibration*, *407*, 106–127.

Conference Papers

2019 Ramana, G. V., **Pathak, S.**, & Dev, H. (2019). Shear strength parameters of granite rock mass: A case study. In V. Stalin & M. Muttharam (Eds.), *Geotechnical characterisation and geoenvironmental engineering: Lecture notes in civil engineering* (Vol. 16, pp. 273–280). Springer, Singapore.

2018 **Pathak, S.**, & Ramana, G. V. (2018c). Uncertainties of a nuclear-air-blast induced ground displacement model. In B. Fatahi, A. Mwanza, & D. Chang (Eds.), *Geochina 2018: Civil infrastructures confronting severe weathers and climate changes conference* (pp. 183–196). Springer, Cham.

2018 **Pathak, S.**, & Ramana, G. V. (2018b). A stress-strain model for geomaterials subjected to air-blast. In A. Zhou, J. Tao, X. Gu, & L. Hu (Eds.), *Geoshanghai 2018 international conference: Fundamentals of soil behaviours* (pp. 388–396). Springer, Singapore.

2018 **Pathak, S.**, Ramana, G. V., Senthil, P., Dev, H., & Yadav, R. P. (2018). Deformability characteristics of augen gneisses–a case study. In *National conference on challenges in geotechnical investigations: Analysis, design and construction of foundations* (pp. 155–161). Indian Geotechnical Society–Goa, India.

2018 Ramana, G. V., **Pathak, S.**, & Dev, H. (2018). Role of probabilistic interpretation in recommendations of rock-mass parameters. *ISRM India Journal-Half Yearly Technical Journal of Indian National Group of ISRM*, *7*(1), 11–20.

2017 **Pathak, S.**, & Ramana, G. V. (2017). Air-blast induced ground displacement. *Procedia Engineering: 11th International Symposium on Plasticity and Impact Mechanics–2016*, *173*, 555–562.

2017 **Pathak S.**, Ramana, G. V., Dev, H., & Gupta, S. L. (2017). Implications of uncertainties in in-situ stress measurement in rock-mass. In *Indian geotechnical conference–2017.* IIT Guwahati, India.

2017 **Pathak, S.**, Ramana, G. V., Dev, H., & Mishra, K. K. (2017). Deformation behaviour of jointed rock mass. In *Indian young geotechnical engineers conference–2017* (pp. 87–91). NIT Trichy, India.

2016 **Pathak, S.**, Ramana, G. V., & Dev, H. (2016). Quantification of variation in rock mass deformability. In *Indian rock conference–2016.* IIT Bombay, India.

2016 Ramana, G. V., **Pathak, S.**, Mishra, K. K., & Hari, D. (2016). Hydro-fracturing test in sandstone rock mass: A case study from himalayas. In H. S. Venkatesh & V. Venkateswarlu (Eds.), *Proceedings of the conference on recent advances in rock engineering–2016* (Vol. 91). Atlantis Press.

2016 Ramana, G. V., **Pathak, S.**, Mishra, K. K., Dev, H., & Gupta, S. L. (2016). Anisotropic variability in modulus of deformation of biotitic rock mass. In *Indian rock conference–2016.* IIT Bombay, India.

2015 **Pathak, S.**, Yadav, R. P., Ramana, G. V., & Dev, H. (2015). Normal stress dependent deformability of rock mass. In *Indian young geotechnical engineers conference–2015.* Vadodara, India.

2015 **Pathak, S.**, Ramana, G. V., Dev, H., & Singh, R. (2015). Probabilistic interpretation of in-situ shear test data. In *Indian geotechnical conference–2015.* Pune, India.

2014 **Pathak, S.**, Ramana, G. V., Dev, H., & Singh, R. (2014). In-situ deformability and strength characteristics of himalayan granites. *ISRM India Journal-Half Yearly Technical Journal of Indian National Group of ISRM*, *3*(1), 3–10.

2014 **Pathak, S**, Ramana, G. V., Dev, H., & Singh, R. (2014). Permanent deformation modulus of rock-mass. In *Indian geotechnical conference–2014.* Kakinada, India.

2014 Ramana, G. V., **Pathak, S.**, Dev, H., Singh, R., & Gupta, V. K. (2014). Shear strength of deccan granite rock mass in open trench. In R. Singh & H. Dev (Eds.), *Indian rock conference–2014.* New Delhi, India: Indian Society for Rock Mechanics and Tunnelling Technology (New Delhi).

2013 Ramana, G. V., **Pathak, S.**, & Kumar, N. (2013). Selection and interpretation of shear strength parameters for weak phyllites. In Kwasniewski & Łydzba (Eds.), *Rock mechanics for resources, energy and environment: Isrm–international symposium: Eurock-2013* (pp. 331–336). Wroclaw, Poland: Taylor & Francis Group, London.

2013 **Pathak, S.**, Ramana, G. V., Gupta, V. K., Dev, H., & Singh, R. (2013). Statistical approach for rock mass deformability characterization. In *Indian geotechnical conference–2013.* IIT Roorkee, India.

2013 Singh, R., & **Pathak, S.** (2013). In-situ normal stiffness of rock mass. In R. Singh, H. Dev, A. K. Gupta, & S. K. Jain (Eds.), *Indian rock conference–2013* (pp. 181–188). Solan, India: Indian Society for Rock Mechanics and Tunnelling Technology (New Delhi).

2012 Jain, S. K., & **Pathak, S.** (2012). Intensity based casualty models: case study of bhuj and latur earthquake in india. In *World conference on earthquake engineering–2012.* Lisbon, Portugal: Sociedade Portuguesa de Engenharia Sísmica.

Consultancy Works

2012–2019 Evaluation of in-situ rock-mechanics investigations in detailed project reports of various

	hydroelectric projects [Appendix–C]
2010–2011	Design of underground rectangular water tank structure [Client: Additional Process Units, ONGC, Uran] Design of substructures of bridges [Client: Vedanta Aluminium Ltd., Jharsuguda, Odisha]

Paper Presentations

May 2018	Geoshanghai International Conference–2018, Shanghai, China
Dec 2017	Indian Geotechnical Conference–2017, IIT Guwahati, India
Dec 2016	Indian Geotechnical Conference–2016, IIT Madras, India
Jun 2016	Indian Rock Conference–2016, IIT Bombay, India
Dec 2015	Indian Geotechnical Conference–2015, Pune, India
Mar 2015	Indian Young Geotechnical Engineers Conference–2015, Baroda, India
Dec 2014	Indian Geotechnical Conference–2014, Kakinada, India
May 2013	Indian Rock Conference–2013, Solan, India

Training Organized

25–26 Nov 2014	Coordinated a training course on 'In-situ Testing in Rock Mechanics' at Central Soil & Materials Research Station, New Delhi (No. of participants–23)

Membership of Professional Societies

American Society of Civil Engineers (Associate Member) AM-10652565

Indian Geotechnical Society, Delhi Chapter (Life Member) LM-939

Indian Society of Rock Mechanics and Tunneling Technology (Life Member) LM-1934

Academic Profiles and Metrics

Google Scholar	Citations–20, h–index: 2
ResearchGate	RG Score–5.55
Scopus	6 publications
ORCiD	https://orcid.org/0000-0002-3868-2807
Web of Science	7 publications

Appendix A Course-work

Courses taken	Grades obtained
PhD course work at IIT Delhi	
Engineering Properties of rocks and rock-masses (CEL751)	A-
Analysis and Design of Underground Structures (CEL758)	A
Selected Dual Degree course work at IIT Kanpur	
Earthquake Analysis and Design of Structures (CE 629)	A
Structural Dynamics (CE620)	B
Foundation Analysis and Design (CE 632N)	A
Finite Element Methods in Engineering Mechanics (ME 623)	A
Statistical Analysis for Civil Engineers (CE 601)	A
Experimental Methods in Structural Engg. (CE623N)	A
Stability of Structures (CE622N)	A
Structural Design-III (CE421)	A
System Analysis in Civil Engg. (CE451)	A
Design of Steel Structures (CE 321)	A
Design of Reinforced Concrete Structures (CE322)	A
Soil Mechanics (CE331)	A
Geotechnical Engineering (CE332)	A
Structural Analysis (CE 222)	B
Engineering Geosciences (CE242)	A
Mechanics of Solids (ESO204)	B
Computational Methods in Engineering (ESO218)	B

Appendix B Field Experience

Project name & location	***Year***	***In-situ tests***	***Test location***	***River***	***Major rock type***
Kholongchhu Bhutan	2019	Uniaxial jacking test, direct shear test	Dam-axis	Kholongchhu	Granitic-gneiss
Sunni Himachal Pradesh	2019	Hydraulic fracturing test	Powerhouse	Satluj	Quartzite
Luhri-I Himachal Pradesh	2017	Uniaxial jacking test	Dam-axis	Satluj	Augen-gneiss
Pancheshwar (India-Nepal)	2017	Hydraulic fracturing test	Powerhouse	Mahakali	Granite-quartzite
Polavaram Andhra Pradesh	2014 2017	Uniaxial jacking, direct shear test	Spillway-axis	Godavari	Granite-gneiss
Kirthai-I Jammu & Kashmir	2017	in open trench Uniaxial jacking test	Dam-axis	Chenab	Quartz-mica-schist
Mawphu-II Meghalaya	2016	Uniaxial jacking test, direct shear test	Dam-axis	Umiew	Granite-gneiss
Punatsangchhu-II Bhutan	2016	Goodman jack test	Powerhouse, Tail Race Tunnel, Head Race Tunnel	Punatsangchhu	Quartzitic-Biotite-Gneiss
Suntaley Sikkim	2015	Uniaxial jacking test, direct shear test	Dam-axis	Rangpo	Phyllitic-quartzite
Thana-Plaun Himachal Pradesh	2014	Hydraulic fracturing test	Powerhouse	Beas	Sandstone
Kirthai-II Jammu & Kashmir	2013 2012	Uniaxial jacking test, direct shear test	Dam-axis	Chenab	Granite-gneiss

Appendix C Evaluation of Detailed Project Reports

Hydroelectric Project	***Year of Evaluation***
Bokang-Bailing, Uttarakhand	2018
Sunni Dam, Himachal Pradesh	2017
Goriganga III-A, Uttarakhand	2016
Burhai Reservoir, Jharkhand	2015
Loktak Downstream, Manipur	
Turga Pumped Storage, West Bengal	
Pachuk-II, Arunachal Pradesh	2014
Tidding-I & II, Arunachal Pradesh	
Selim, Himachal Pradesh	
Attunli, Arunachal Pradesh	
Subansiri, Arunachal Pradesh	
Rho, Arunachal Pradesh	2013
Tato-I, Arunachal Pradesh	