
Arindam Basu
(Date of Birth: 2nd December 1975)
Professor
Department of Geology & Geophysics, Indian Institute of Technology Kharagpur, Pin- 721302
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Broad Areas of Research

Engineering Geology and Rock Mechanics

Education

Ph.D. Department of Earth Sciences, **The University of Hong Kong**, 2006
(Thesis: "Mechanical characterization of granitic rocks of Hong Kong by improved index testing procedures with reference to weathering induced microstructural changes")

M.Phil. Department of Earth Sciences, **The University of Hong Kong**, 2003
(Thesis: "A study of the origin and evolution of jointing in igneous rocks of Hong Kong")

M.Sc. (Applied Geology) – **First Class**: Department of Earth Sciences, **IIT Bombay**, 1999

B.Sc. (Hons. in Geological Sciences) – **First Class** with **Distinction** in Physics and Mathematics: Department of Geological Sciences, **Jadavpur University**, 1997

Professional Experiences

Professor, Department of Geology & geophysics, **IIT Kharagpur** (16th March 2018 – till date)

Associate Professor, Department of Geology & Geophysics, **IIT Kharagpur** (30th Oct. 2013 – 15th March 2018)

Assistant Professor, Department of Geology & Geophysics, **IIT Kharagpur** (25th Apr. 2007 – 29th Oct. 2013)

Postdoctoral Fellow (FAPESP), Departamento de Geotecnia, **Universidade de São Paulo** (2006-2007)

International Recognitions

- **Member of the Editorial Board** of **Bulletin of Engineering Geology and the Environment**, **Springer**
- **Former Member of the Editorial Board** of **Engineering Geology**, **Elsevier** (2016-2019)
- **Outstanding Reviewer Status** awarded by **International Journal of Rock Mechanics and Mining Sciences, Elsevier** (2018)
- **Outstanding Reviewer Status** awarded by **Engineering Geology, Elsevier** (2018)
- **Outstanding Reviewer Status** awarded by **Tunnelling and Underground Space Technology Incorporating Trenchless Technology Research, Elsevier** (2018)
- **Highly Cited Research** Certificate awarded by **The Editors of Engineering Geology, Elsevier** (2017) in recognition of the contribution to the quality of the journal made by: "Estimation of uniaxial compressive strength of rock materials by index tests using regression analysis and fuzzy inference system"
- **Outstanding Reviewer Status** awarded by **Engineering Geology, Elsevier** (2016)
- **External Examiner of the PhD thesis** entitled "Engineering geological evaluation of transported tropical red soils" by Mr. G. E. Brink, **University of Pretoria** (2015)
- **Outstanding Reviewer Status** awarded by **International Journal of Rock Mechanics and Mining Sciences, Elsevier** (2014)

- **Postdoctoral Fellowship** by **FAPESP** @ **Universidade de São Paulo** (2006-2007)
- **Postdoctoral Fellowship** offered by **University of Witwatersrand, Johannesburg** (2006) [***Not availed***]
- **Postgraduate Studentship** by CRCG @ **The University of Hong Kong** during M.Phil. and Ph.D. studies

National Recognitions

- **External Examiner of the Ph.D. Thesis** entitled "Petro-physico and mechanical behavior of reservoir rocks under static and dynamic conditions" by Ms. Mahin Esmaeil Zaei, **IIT Delhi** (2019)
- **External Examiner of the Ph.D. Thesis** entitled "Experimental characterization of rock salt for undergound structures" by Mr. Chandan Kumar, **IIT Delhi** (2019)
- **Examiner** for evaluation of dissertation seminar & composite viva-voce of IV Sem. **M.Tech. in Engineering Geology at IIT (ISM) Dhanbad** (2018-2019)
- **External Examiner of the Ph.D. Thesis** entitled "Investigation and Assessement of Physico-morphological and Thermo-Mechanical Responses of Few Sedimentary Rocks" by Mr. Bankim Chandra Mahanta, **IIT Bombay-Monash University Research Academy** (2018-2019)
- **External Examiner of the Ph.D. Thesis** entitled "Stress and Deformational Behavior of Weak Jointed Rock mass during Tunnelling" by Mr. Ratan Das, **IIT Bombay** (2018-2019)
- **Best Paper Award** granted to H. K. Singh and A. Basu for their paper entitled "Influence of Surface Morphology on the Peak Shear Strength of 'Real' Natural Rock Discontinuities" at the 4th Indian Landslide Congress held during December 8-9, 2017, **IIT Bombay**
- **Invited lecturer** in the AICTE sponsored QIP Short term training program on INVESTIGATION IN SOIL AND ROCK FOR OPTIMAL GEOTECHNICAL DESIGNS, 20-25 February 2017, organized by DEPARTMENT OF CIVIL ENGINEERING, **IIT Madras**
- Served as **Examiner** of an **MS thesis** from **IIT Kharagpur** (2016)
(Thesis: "Development of Mill Tailing based Backfill Material and 3D Analytical Model of Earth Pressure for Supporting Underground Stope" by Saurabh Jain)
- **Session Co-chairman** in INDOROCK 2016, 17-18 June 2016, **IIT Bombay**
- **Keynote Speaker** (Title of the talk: "**International Practices in Engineering Geology: Education in India**") in International Conference on "Engineering Geology in New Millennium", 27-29 October 2015, **IIT Delhi, India**.
- Received **Geological Society of India (GSI) Sesquicentennial Commemorative Award** in recognition of valuable contribution in the field of Engineering Geology (2013)
- Served as **External Paper Setter** (Subject: 'Geotechnical Behaviour of Earth Materials', Curriculum: M.Tech. in Engineering Geology, **ISM, Dhanbad**) for two consecutive Monsoon Semesters (2014-2015; 2015-2016)
- Selected as a **Member of the Editorial Board** of ***Journal of the Geological Society of India*** **(for Fast Track Articles)** (2012)
- Served as a **Member of the Editorial Board** of ***Journal of Engineering Geology*** (Vol. XXXVII, Nos. 1-4) published by **Indian Society of Engineering Geology** (2011)
- **DST Young Scientist** (Project approved for funding in 2008)

As a Reviewer

Engineering Geology (**Elsevier**)

International Journal of Rock Mechanics and Mining Sciences (**Elsevier**)

Marine and Petroleum Geology (**Elsevier**)

Journal of Building Engineering (**Elsevier**)

Tunnelling and Underground Space Technology (**Elsevier**)

Bulletin of Engineering Geology and the Environment (**Springer**)

Earth Science Informatics (**Springer**)

Environmental Earth Sciences (**Springer**)

Journal of Earth System Science (**Springer, Published by the Indian Academy of Sciences**)

Arabian Journal of Geosciences (**Springer**)

Geotechnical Testing Journal (**American Society for Testing and Materials, ASTM International**)

Journal of Materials in Civil Engineering (**American Society of Civil Engineers, ASCE**)

Current Science (**Current Science Association, in collaboration with the Indian Academy of Sciences**)

International Journal of Damage Mechanics (**SAGE Publications**)

Member – Professional Body

International Association for Engineering Geology and the Environment (**IAEG**)

International Society for Rock Mechanics and Rock Engineering (**ISRM**)

Indian Society of Engineering Geology (**ISEG**)

Indian Society for Rock Mechanics and Tunneling Technology (**ISRMTT**)

Publications (Google Scholar Citations: 1210; h-index: 13; i10-index: 16)

In SCI Journals

1. Ram, B. K., **Basu, A. 2019.** A modified JRC-JCS model and its applicability to weathered joints of granite and quartzite. ***Bulletin of Engineering Geology and the Environment***, doi.org/10.1007/s10064-019-01531-0. [Impact Factor: **2.138**; Journal published by **Springer]**

2. Ram, B. K., **Basu, A. 2019.** Shear behavior of unfilled-planar quartzitic rock joints with reference to weathering grade of joint surfaces. ***Rock Mechanics and Rock Engineering***, 52, 4113-4121. [Impact Factor: **4.100**; Journal published by **Springer**]

3. Srigyan, M., **Basu, A.**, Mukherjee, A., Sengupta, P. and Sen, J. **2019.** Identification of paleochannels in and around "Chandraketugarh", Ganges Delta through remote sensing techniques using fuzzy inference system. ***Archaeological and Anthropological Sciences***, 11, 839-852. [Impact Factor: **1.978**; Journal published by **Springer]**

4. Singh, H. K., **Basu, A. 2018**. Evaluation of existing criteria in estimating shear strength of natural rock discontinuities. ***Engineering Geology***, 232, 171-181. [Impact Factor: **3.909**; Journal published by **Elsevier**]

5. Singh, H. K., **Basu, A. 2018**. A comparison between the shear behavior of 'real' natural rock discontinuities and their replicas. ***Rock Mechanics and Rock Engineering***, 51, 329-340. [Impact Factor: **4.100**; Journal published by **Springer**]

6. Singh, H. K., **Basu, A. 2016**. Shear behaviors of 'real' natural un-matching joints of granite with equivalent joint roughness coefficients. ***Engineering Geology***, 211, 120-134. [Impact Factor: **3.909**; Journal published by **Elsevier**]

7. Mishra, D. A., Srigyan, M., **Basu, A.**, Rokade, P. J. **2015**. Soft computing methods for estimating the uniaxial compressive strength of intact rock from index tests. ***International Journal of Rock Mechanics and Mining Sciences***, 80, 418-424. [Impact Factor: **3.780**; Journal published by **Elsevier**]

8. Basu, A. 2014. Comment on "New weathering classifications for granitic rocks based on geomechanical parameters" by M. Heidari, A. A. Momeni, F. Naseri [Eng. Geol.166 (2013) 65–73]. ***Engineering Geology***, 183, 330-331. [Impact Factor: **3.909**; Journal published by **Elsevier**]

9. Basu, A., Mishra, D. A. **2014**. A method for estimating crack-initiation stress of rock materials by porosity. ***Journal of the Geological Society of India***, 84, 397-405 [Impact Factor: **0.994**; Journal published by **Springer**]

10. Basu, A., Mishra, D. A., Roychowdhury, K. **2013**. Rock failure modes under uniaxial compression, Brazilian and point load tests. ***Bulletin of Engineering Geology and the Environment*** (**official journal of IAEG**), 72, 457-475 [Impact Factor: **2.138**; Journal published by **Springer**]

11. Mishra, D. A., **Basu, A. 2013**. Estimation of uniaxial compressive strength of rock materials by index tests using regression analysis and fuzzy inference system. ***Engineering Geology***, 160, 54-68. [Impact Factor: **3.909**; Journal published by **Elsevier**]

12. Mamtani, M. A., Vishnu, C. S., **Basu, A. 2012**. Quantification of micro-crack anisotropy in quartzite-a comparison between experimentally undeformed and deformed samples. ***Journal of the Geological Society of India***, 80, 153-166. [Impact Factor: **0.994**; Journal published by **Springer**]

13. Mishra, D. A., **Basu, A. 2012**. Use of the block punch test to predict the compressive and tensile strengths of rocks. ***International Journal of Rock Mechanics and Mining Sciences***, 51, 119-127. [Impact Factor: **3.780**; Journal published by **Elsevier**]

14. Basu, A., Ghosh, N., Das, M. **2012**. Categorizing weathering grades of quartzitic materials and assessing Brazilian tensile strength with reference to assigned grades. ***International Journal of Rock Mechanics and Mining Sciences***, 49, 148-155. [Impact Factor: **3.780**; Journal published by **Elsevier**]

15. Banerjee, K. S., **Basu, A.**, Guin, R., Sengupta, D. **2011**. Radon (^{222}Rn) level variations on a regional scale from the Singhbhum Shear Zone, India: a comparative evaluation between influence of basement U-activity and porosity. ***Radiation Physics and Chemistry***, 80, 614-619. [Impact Factor: **1.984**; Journal published by **Elsevier**]

16. Basu, A., Kamran, M. **2010**. Point load test on schistose rocks and its applicability in predicting uniaxial compressive strength. ***International Journal of Rock Mechanics and Mining Sciences***, 47, 823-828. [Impact Factor: **3.780**; Journal published by **Elsevier**]

17. Vishnu, C. S., Mamtani, M. A., **Basu, A. 2010**. AMS, ultrasonic P-wave velocity and rock strength analysis in quartzites devoid of mesoscopic foliations – implications for rock mechanics studies. ***Tectonophysics***, 494, 191-200. [Impact Factor: **2.764**; Journal published by **Elsevier**]

18. Basu, A., Celestino, T. B., Bortolucci, A. A. **2009**. Evaluation of rock mechanical behaviors under uniaxial compression with reference to assessed weathering grades. ***Rock Mechanics and Rock Engineering***, 42, 73-93. [Impact Factor: **4.100**; Journal published by **Springer**]

19. Basu, A., Aydin, A. **2006**. Evaluation of ultrasonic testing in rock material characterization. ***Geotechnical Testing Journal***, 29, 117-125. [Impact Factor: **1.279**; Journal published by **ASTM**]

20. Basu, A., Aydin, A. **2006**. Predicting uniaxial compressive strength by point load test: significance of cone penetration. ***Rock Mechanics and Rock Engineering***, 39, 483-490. [Impact Factor: **4.100**; Journal published by **Springer**]

21. Aydin, A., **Basu, A. 2006**. The use of Brazilian test as a quantitative measure of rock weathering. ***Rock Mechanics and Rock Engineering***, 39, 77-85. [Impact Factor: **4.100**; Journal published by **Springer**]

22. Aydin, A., **Basu, A. 2005**. The Schmidt hammer in rock material characterization. ***Engineering Geology***, 81, 1-14. [Impact Factor: **3.909**; Journal published by **Elsevier**]

23. Basu, A., Aydin, A. **2004**. A method for normalization of Schmidt hammer rebound values. ***International Journal of Rock Mechanics and Mining Sciences***, 41, 1211-1214. [Impact Factor: **3.780**; Journal published by **Elsevier**]

As Book Chapters

1. Shaw, A., Das, P., Layek, M. K., Chakraborty, M., Jamal, M. S., Sengupta, P., **Basu, A.**, Sen, J., Mukherjee, A. **2018**. Chapter 8: Exploration of groundwater-enriched aquifers of central Gangetic basin, India using geomorphic signatures. ***A. Mukherjee (ed.), Groundwater of South Asia, Springer Singapore***, 119-129.

2. Basu, A. 2015. Applicability of Weathering Classification to Quartzitic Materials and Relation Between Mechanical Properties and Assigned Weathering Grades: A Comparison with Investigations on Granitic Materials. ***G. Lollino et al. (eds.)***, ***Engineering Geology for Society and Territory, Springer International Publishing Switzerland,*** 6, 865-868.

In Conference Proceedings

1. Basu, A. 2017. Rock failure modes under uniaxial compression and indirect tension. *AfriRock 2017*, ***Cape Town, South Africa***.

2. Singh, H. K., **Basu, A.** 2017. Influence of Surface Morphology on the Peak Shear Strength of 'Real' Natural Rock Discontinuities. *4th Indian Landslide Congress*, ***IIT Bombay, India***.

3. Ram, B. K., **Basu, A.** 2016. Shear behavior of planar unfilled rock discontinuities with reference to surface morphology under constant normal load. *RARE 2016*, ***Bengaluru, India***, 351-354.

4. Singh, H. K., **Basu, A.** 2016. Shear behavior of planar unfilled rock discontinuities with reference to surface morphology under constant normal load. *RARE 2016*, ***Bengaluru, India***, 318-323.

5. Basu, A. 2012. Mechanical characterization of schistose rocks. *EUROCK 2012*, ***Stockholm, Sweden***.

6. Vishnu, C. S., Mamtani, M. A., **Basu, A.** 2010. Application of anisotropy of magnetic susceptibility as a gauge of rock strength anisotropy. *ISRM International Symposium 2010 and 6th Asian Rock Mechanics Symposium*, ***New Delhi, India***.

7. Basu, A. 2010. Point load test on anisotropic rocks. *11th Congress of the International Association for Engineering Geology and the Environment (IAEG)*, ***Auckland, New Zealand***, 1689-1694.

8. Mishra, D. A., **Basu, A.** 2009. Microstructural control on uniaxial compressive strength of granitic rocks. *ACSGE-2009*, ***BITS Pilani, India***.

9. Basu, A., Celestino, T. B., Bortolucci, A. A. 2007. Predicting weathering grades by Schmidt hammer test: an investigation on granitic rock materials from Southeastern Brazil. *11th Congress of the International Society for Rock Mechanics (ISRM)*, ***Lisbon, Portugal***, 385-390.

10. Aydin, A., **Basu, A.**, 2002. Origin and engineering implications of sheeting joints. *9th Congress of the International Association for Engineering Geology and the Environment (IAEG)*, ***Durban, South Africa***, 1736-1745.

Sponsored Research Projects

1. Co-PI of "SANDHI, Science -Technology & Culture - Heritage Interface by IIT Kharagpur" sponsored by MHRD, Department of Higher Education, New Delhi [Research Completed]

2. PI of "Predicting crack initiation stress by porosity and evaluating microstructural control on crack initiation: a study on granite" sponsored by DST, New Delhi [Research Completed]

3. PI of "Quantitative assessment of weathering grades of rock materials" sponsored by ISIRD, IIT Kharagpur [Research Completed]

4. Co-PI of "The relationship between anisotropy of magnetic susceptibility, strength anisotropy and microstructure in rocks devoid of mesoscopic foliations" sponsored by DST, New Delhi [Research Completed]

Teaching Experience @ IIT Kharagpur

Subjects taught from Autumn 2007 to Spring 2018 are enlisted below together:
Engineering Geology (GG31007)
Engineering Geology Lab. (GG39007)
Groundwater and Engineering Geology (GG50009)
Groundwater and Engineering Geology Lab. (GG59009)
Groundwater and Engineering Geology (GG40007)
Engineering Properties of Rocks and Soils (EX60032)
Engineering Geology Lab. (GG69006)
Natural Hazards and Mitigation (EX60001)
Environmental Hazards and Mitigation (GG40006)
Physics of the Solid Earth (EX20002)
Deformation in Rocks (GG43003)
Determinative Mineralogy Lab (GG23904)
Determinative Mineralogy Lab (GG29002)
Field Work (GG28002)
Field Work (EX28002)
Field Work (GG38002)
Field Work (EX38002)
Research Oriented Topics-I (EX60031)
Research Oriented Topics-II (GG60028)
Engineering and Economic Geology (GG21109)- For Mining Engineering students
Geology Laboratory (GG29009)- For Mining Engineering students

Supervision @ IIT Kharagpur

Ph.D. Completed: 4 (3 sole supervision, 1 joint supervision)

M.Tech. Completed: 12 (12 sole supervision)

M.Sc. Completed: 37 (36 sole supervision, 1 joint supervision)

Details of the Completed Ph.D. Dissertations

1. Name: Bikash Kumar Ram
Dissertation: Shear behavior of planar-unfilled rock joints: a study with reference to natural weathered surfaces of quartzite and granite, and acid-attacked surfaces of limestone. (**Completed.** The Ph.D. Viva-Voce examination was held on **22nd October 2019**).
Supervisor: **A. Basu**

2. Name: Hemant Kumar Singh
Dissertation: Shear behavior of 'real' natural un-matching rock discontinuities under constant normal load condition. (**Completed.** The Ph.D. Viva-Voce examination was held on **14th February 2018**).
Supervisor: **A. Basu**

3. Name: Deepak Amban Mishra
Dissertation: Evaluation of uniaxial compressive and indirect tensile strengths of granite, schist and sandstone by index tests and microstructural analysis. (**Completed.** The Ph.D. Viva-Voce examination was held on **26th August 2013**).
Supervisor: **A. Basu**

4. Name: Vishnu C. S.
Dissertation: Fabric analysis and anisotropy quantification in massive quartzite - implications to rock mechanics. (**Completed.** The Ph.D. Viva-Voce examination was held on **20th November 2012**).
Supervisors: M. A. Mamtani and **A. Basu**

Contribution to Student Life at Institute Level

- **Member of the Council of Dean, Students' Affairs** (2nd Nov. 2017-till date)
- **Induction Co-coordinator (Technology)**, Academic (U.G) Section (2017-till date)
- **One of the Advisors** of the IIT Kharagpur **Young Innovators' Program (YIP)** 2017
- **Assistant Warden**, R. K. Hall of Residence (23rd Jul. 2014-22nd Jan. 2017)
- **Rector's Nominee**, Technology (Technology Students' Gymkhana) (2013-2017)
- **Chairperson**, **Kshitij** Annual Techno-Management Festival (2017)
- **Chairperson**, **Kshitij** Annual Techno-Management Festival (2016)
- **Chairperson**, **Kshitij** Annual Techno-Management Festival (2015)

Contribution to Student Life at Department Level

- **PG Coordinator** (2019-till date)
- **Faculty Advisor** of M.Tech. Students (2019-till date)
- **Advisor**, Research Scholars' Day, Geology & Geophysics (2016)
- **Faculty Advisor** of 2010 (Integrated M.Sc.) Applied Geology students (2010-2017)
- **Faculty Advisor** of 2013 (2 Yr. M.Sc.) Geology students (2013-2015)
- **Faculty Advisor** of 2010 (Integrated M.Sc.) Exploration Geophysics Students (2010-2013)

Involvement in Institutional Works (and beyond)

- **Confidential operations at various capacities (since 2009)**
- **Conducting JEE 2010** at outstation center.
- **Presiding Officer** in IITEU Election **2014**
- **Evaluator of answer scripts** for the selection of Junior Assistants **2015**
- **Member** of several doctoral scrutiny committees
- **Reviewer** of ISIRD, IIT Kharagpur Research Proposal

Involvement in Organizing Short-term course, Workshop and Exhibition

- Contribution to the exhibited materials and demonstration at **"SANDHI Exhibition, 11-13 September 2015, ICCR, Kolkata"**
- Contribution to organizing and conducting **"SANDHI Geo-quest & Geo-archaeological Workshop, 14-17 October 2014, IIT Kharagpur"**
- Contribution as a Course Coordinator of and to organizing **"AICTE-sponsored QIP Short-term course on "Solid and hazardous waste management" 12-19 November 2010, IIT Kharagpur"**

Other Departmental Works Performed

Laboratory In-charge of Engineering Geology Lab.

Member of the Academic Committee (Jan. 2016 - till date)

Central Library Representative (2011- 2013, Jan. 2016 - till date)

Member of Purchase Committee (2009 - till date)

Preparation of Annual Report of the Department (2008-2013, 2016 onward)

ERP Representative at the Department of Geology & Geophysics (2009 - 2013)

Compilation of Departmental information for the 'Court' (2011-12)

Laboratory In-charge of Museum (2009-2011)

Compilation of Departmental Information for IITKGP Newsletter (2008-2009)

Departmental maintenance (2007-2008)

Selected Seminars/Conferences Attended

1. XIII IAEG Congress, 17-21 September 2018, **San Francisco, USA**.

2. The 11th Asian Regional Conference (ARC-11), 28-30 November 2017, **Kathmandu, Nepal**.

3. AfriRock 2017, 1-7 October 2017, **Cape Town, South Africa.**

4. INDOROCK 2016, 17-18 June 2016, **IIT Bombay, India**.

5. International Conference on "Engineering Geology in New Millennium", 27-29 October 2015, **IIT Delhi, India**.

6. 12th IAEG Congress, 15-19 September 2014, **Torino, Italy**.

7. ESEMR, 14-16 November 2013, **ISM Dhanbad, India**.

8. National Workshop on 'Contemporary practices in Engineering Geology and Geohazards', 14th June 2013, **Hyderabad, India**.

9. EUROCK 2012, 28-30 May 2012, **Stockholm, Sweden**.

10. International Conference on Underground Space Technology and the 8th Asian Regional Conference of IAEG, 17-19 January 2011, **Bangalore, India**.

11. ISRM International Symposium 2010 and 6th Asian Rock Mechanics Symposium, 23-27 October 2010, **New Delhi, India**.

12. 11th IAEG Congress, 5-10 September 2010, **Auckland, New Zealand**.

13. International Conference on Advances in Concrete, Structural and Geotechnical Engineering, 25-27 October 2009, **BITS Pilani, India**.

14. ISEG Seminar on Challenges in Engineering Geology, 3-5 December 2008, **Hyderabad, India**

15. GEOTECH-08, January 2008, **Chandigarh, India**.

16. 4th Asian Symposium on Engineering Geology and the Environment, 3-5 May 2004, **Hong Kong, HKSAR**.

17. Symposium on Hong Kong Soils and Rocks, 27th March 2004, **Hong Kong, HKSAR**.

18. Lecture by Professor P. G. Fookes: "Total Geological History: A model approach to the anticipation, observation and understanding of site conditions for engineers", 2nd December 2003, **Hong Kong, HKSAR**.

19. 9th IAEG Congress, 16-20 September 2002, **Durban, South Africa**.
