

## Dr. Ratan Das

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## Broad Areas of Research

Engineering Geology, Rock Mechanics.

## Education

**Post-Doctoral Fellow**, Department of Geology and Geophysics, **IIT Kharagpur**, (Mar 2020 - Jul 2021)

**Ph.D.** Department of Earth Sciences, **IIT Bombay**, February 2019

**M.Sc.** (Applied Geology) Department of Earth Sciences, **IIT Bombay**, 2015

**B.Sc.** (Geology) Department of Geology, Cotton College, **Gauhati University**, 2013

## Editorships

**Guest Editor**, Special Issue in **Discover Geoscience (Springer)** [Link](#)

**Guest Editor**, Special Issue in **Environmental Earth Sciences (Springer)** [Link](#)

## Research Projects

Sl No	Project Title	Funding Agency	Year	Fund sanctioned (INR)
1	Evaluation of geohazard risks due to climatic and geologic factors in the Cachar-Tripura-Mizoram (CTM) fold belt of northeast India: A coupled hydromechanical and geotechnical modelling <b>File Number: SRG/2022/000447</b>	DST SERB	2022-2024 (2 years)	33,00,000
2	Analysis of growth and initiation mechanism of rainfall-induced debris slides in Dima Hasao, Assam	In House	2023-2025	1,00,000

## Awards and Achievements

- Received the **International Travel Support (ITS)** award from DST-SERB, 2023.
- Awarded the **Startup Research Grant (SRG)** from DST-SERB, 2022.
- Cleared **Joint CSIR-UGC NET** in **June 2020**.
- Cleared **IIT - JAM**, 2013, **ISM** 2013, and **IIT GATE GG 2015 to 2021**.
- Recipient of “Chief Minister's Scheme for **Financial Assistance** to Meritorious Student of Assam” for qualifying IIT-JAM Entrance Examination in the Year 2013.
- Recipient of “**Anundoram Borooah Award**” and “**Amul Vidyashree Award**” for excellent academic performance in Matriculation 2008.

## Teaching Experience

**Assistant Professor**, Department of Geology, **Cotton University, Guwahati, Assam** (7<sup>th</sup> May 2022 - Present)

**Assistant Professor**, Department of Earth Science, **Assam University, Silchar, Assam** (14<sup>th</sup> July 2021 - 6<sup>th</sup> May 2022)

**Guest Assistant Professor**, Department of Geology, **Rajiv Gandhi University, Itanagar** (14<sup>th</sup> Sept 2018 – 13<sup>th</sup> March 2020)

Teaching Assistant, Department of Earth Sciences, IIT Bombay, Powai (16<sup>th</sup> July 2015 – 27<sup>th</sup> June 2018)

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### **Publications in International Journals**

1. Mazumder D, **Das R**, Das S, 2025. Multi-Criteria Decision Analysis Framework for Landslide Susceptibility Mapping with Analytical Hierarchy Process in Parts of Assam–Arakan Fold Belt, India, **Geological Journal**, 1-16, [ISSN / eISSN: 0072-1050 / 1099-1034] <https://doi.org/10.1002/gj.5229>
2. Das S, **Das R**, Mazumder D, 2025. Runout Characteristics of Rainfall-Induced Debris Flow: A Case Study from Sonapur, Meghalaya, India, **Geotechnical and Geological Engineering**, 43, 122. [ISSN / eISSN: 0960-3182 / 1573-1529] <https://doi.org/10.1007/s10706-025-03078-2>
3. **Das R**, 2024. Catastrophic landslide in Wayanad district of Kerala, India on July 30, 2024: A complex interplay between geology, geomorphology, and climate. **Landslides**. 22, 271–281. [ISSN / eISSN: 1612-510X / 1612-5118] <https://doi.org/10.1007/s10346-024-02385-8>
4. **Das R**, Singh TN, 2024. Geotechnical Insights of the Cut Slopes Along Silchar-Haflong National Highway, Assam, India. **Geotechnical and Geological Engineering**. 42, 6195–6217. [ISSN / eISSN: 0960-3182 / 1573-1529] <https://doi.org/10.1007/s10706-024-02892-4>
5. **Das R**, Singh TN, 2022. A novel technique for temporal evolution of rockburst in underground rock tunnel: an experimental study. **Environmental Earth Sciences**. 81 (17), 420. [ISSN / eISSN: 1866-6280 / 1866-6299] <https://doi.org/10.1007/s12665-022-10546-y>
6. **Das R**, Phukon P, Singh TN, 2021. Understanding the cause and effect relationship of debris slides in Papumpare district, Arunachal Himalaya, India. **Natural Hazards**. 110, 1735-1760. [ISSN / eISSN: 0921-030X / 1573-0840] <https://doi.org/10.1007/s11069-021-05010-2>
7. **Das R**, Dhouchak R, Singh TN, 2021. Analysis and prediction of brittle failure in rock blocks having a circular tunnel under uniaxial compression using acoustic Emission technique: laboratory testing and numerical simulation. **International Journal of Geo-Engineering**. 12, 14. [ISSN / eISSN: 2092-9196 / 2198-2783] <https://doi.org/10.1186/s40703-020-00136-x>
8. **Das R**, Singh, TN, 2021. Effect of Rock Bolt Support Mechanism on Tunnel Deformation in Jointed Rockmass: A Numerical Approach. **Underground Space**. 6, 409-420. [ISSN / eISSN: 2096-2754 / 2467-9674] <https://doi.org/10.1016/j.undsp.2020.06.001>
9. **Das R**, Singh TN, 2020. Effect of Closely Spaced, Non-Persistent Ubiquitous Joint on Tunnel Boundary Deformation: A Case Study from Himachal Himalaya. **Geotechnical and Geological Engineering**. 39, 2447-2459. [ISSN / eISSN: 0960-3182 / 1573-1529] <https://doi.org/10.1007/s10706-020-01637-3>
10. Panthee S, Singh PK, Kainthola A, **Das R**, Singh TN, 2018. Comparative study of the deformation modulus of rock mass - a reply to the comments received from Gokceoglu (2018). **Bulletin of Engineering Geology and the Environment**. 77, 763–766. [ISSN / eISSN: 1435-9529 / 1435-9537] <https://doi.org/10.1007/s10064-018-1272-z>
11. **Das R**, Singh PK, Kainthola A, Panthee S, Singh TN, 2017. Numerical analysis of surface subsidence in asymmetric parallel highway tunnels. **Journal of Rock Mechanics and Geotechnical Engineering**. 9, 170–179. [ISSN / eISSN: 1674-7755 / 2589-0417] <https://doi.org/10.1016/j.jrmge.2016.11.009>
12. Guha Roy D, Singh TN, Kodikara J, **Das R**, 2017. Effect of Water Saturation on the Fracture and Mechanical Properties of Sedimentary Rocks. **Rock Mechanics and Rock Engineering**. 50, 2585–2600. [ISSN / eISSN: 0723-2632 / 1434-453X]

<https://doi.org/10.1007/s00603-017-1253-8>

13. Panthee S, Singh PK, Kainthola A, **Das R**, Singh TN, **2016**. Comparative study of the deformation modulus of rock mass. **Bulletin of Engineering Geology and the Environment**. 77, 751–760. [ISSN / eISSN: 1435-9529 / 1435-9537]  
<https://doi.org/10.1007/s10064-016-0974-3>

### **Full Articles in International Conferences**

1. Mazumder D, **Das R**, Das S, **2024**. Laboratory Simulation of Rockfall Hazard in Different Sedimentary Rocks of Mizoram, India. Proceedings of the 2<sup>nd</sup> International Conference on Geotechnical Issues in Energy, Infrastructure and Disaster Management. **ICGEID 2024**. Lecture Notes in Civil Engineering, vol. 475 Springer, Singapore, 77-92, [eBook ISBN: 978-981-97-1757-6] [https://doi.org/10.1007/978-981-97-1757-6\\_7](https://doi.org/10.1007/978-981-97-1757-6_7)
2. **Das R**, **2023**. Tunnelling in squeezing ground – a review on prediction and measurement of boundary deformation and available mitigation methods, in: **5<sup>th</sup> International Disaster Risk and Vulnerability Conference (DVRC 2023)**. K. R. Baiju, Karunakaran Akhildev, Joice K Joseph, Naveen Babu, Anithomas Idiculla, Asha Rose, Shibu K Mani, Mahesh Mohanand A.P. Pradeep kumar (Eds) 19 January- 21 January 2023, Mahatma Gandhi University, Kottayam, Kerala, India. [ISBN: 978-93-80419-73-2]  
[https://drvcdisaster.wordpress.com/wp-content/uploads/2024/09/drvc2023\\_proceedings\\_final.pdf](https://drvcdisaster.wordpress.com/wp-content/uploads/2024/09/drvc2023_proceedings_final.pdf)
3. Prasad S, **Das R**, Singh TN, **2018**. Estimation of Rock Bolt Length for a Tunnel by Numerical Modeling: A Case Study in Himalayas, Arunachal Pradesh, India, in: **ISRM International Symposium - 10th Asian Rock Mechanics Symposium, ARMS 2018**. OnePetro, Z. Zhao, Y. Zhou, J. Shang (Eds) 29 October - 3 November - 2018, Singapore. [ISBN: 978-981-11-9003-2]  
<https://onepetro.org/ISRMARMS/proceedings/ARMS1018/All-ARMS1018/ISRM-ARMS10-2018-159/43325>
4. **Das R**, Sharma KM, Singh TN, **2018**. Physical and Numerical Model to Investigate Shallow Tunnel Instabilities in Loose Soil, in: **International Conference on Geo-Mechanics, Geo-Energy and Geo-Resources – IC3G 2018**, Sichuan University, Chengdu, China.
5. Prasad S, **Das R**, Singh TN, Prasad R, **2018**. Geological and Geotechnical Problems Encountered during Construction of Butterfly Valve Chamber and Penstock Assembly Chamber of Tehri Pumped Storage Plant, in: **International Conference on Geo-Mechanics, Geo-Energy and Geo-Resources – IC3G 2018**, Sichuan University, Chengdu, China.
6. Prasad S, **Das R**, Singh TN, Prasad R, **2018**. Assessment Causes of Overbreak and Control Measures In Underground Tunnel during Construction - A Case Study from Central Himalayas (HP), in: **International Conference on Geo-Mechanics, Geo-Energy and Geo-Resources – IC3G 2018**, Sichuan University, Chengdu, China.
7. **Das R**, Sirdesai NN, Singh TN, **2017**. Analysis of Deformational Behavior of Circular Underground Opening in Soft Ground Using Three-Dimensional Physical Model, in: **American Rock Mechanics Association (ARMA) 2017**, 51st US Rock Mechanics / Geomechanics Symposium (5 VOLS). San Francisco, California, USA. [ISBN: 978-15-1085-7582]  
<https://onepetro.org/ARMAUSRMS/proceedings/ARMA17/All-ARMA17/ARMA-2017-0172/124188>
8. Singh PK, **Das R**, Singh KK, Singh TN, **2016**. Landslide in fractured and stratified rocks - A case from Aizawl, Mizoram, India, in: Proceedings of the Conference on **Recent Advances in Rock Engineering (RARE 2016)**, Bengaluru, India. Atlantis Press, Paris, France, pp. 189–194. doi:10.2991/rare-16.2016.59, [ISBN: 978-94-6252-2-2] <https://www.atlantis-press.com/proceedings/rare-16/25864904>

### **Full Articles in National Conferences**

1. **Das R**, Singh TN, **2017**. Numerical Modelling of Horseshoe Shaped Tunnel to Analyse the Extent and Effect of Disturbed Zone in Jointed Rockmass under Variable Joint spacing, in: **INDOROCK 2017: 7th Indian Rock Conference**. New Delhi, pp. 325–335.
2. **Das R**, Singh PK, Kainthola A, Singh TN, **2016**. Deformational Behavior of Jointed Rockmass during Tunnelling and Determination of Support System Using Finite Element Method, in: **INDOROCK 2016: 6th Indian Rock Conference**. pp. 314–333.

### **Abstracts / Extended Abstracts in International Conference Proceedings/Journals/Books**

1. **Das R** (2025) Stress and deformational behaviour of weak jointed rock mass during tunnelling, **Journal of Rock Mechanics and Tunnelling Technology (JRMTT)**, Editor: Subhash Mitra, R. K. Goel, R. D. Dwivedi, Ashok Kumar Singh. **Vol. 31, No.1**. [ISSN: 0971-9059]
2. Das S, **Das R**, Mazumder D (2024) Engineering characterisation of landslide derived material: A case study on Sonapur landslide, Meghalaya. In: **International Conference on Climate Change and Natural Resources Management for Sustainable Development (ICNS-2024)**, Editors: B.P. Mishra, Santanu Ghosh, Laltanpuia Renthlei, Madhurima, Organized by School of Earth Sciences and Natural Resources Management, Mizoram University, Aizawl, Mizoram, India.
3. Mazumder D, **Das R**, Das S (2024) Understanding the multi-aspect debris characteristics of a landslide along the Lumding-Haflong road section. In: **International Conference on Climate Change and Natural Resource Management for Sustainable Development (ICNS-2024)**, Editors: B.P. Mishra, Santanu Ghosh, Laltanpuia Renthlei, Madhurima, Organized by School of Earth Sciences and Natural Resources Management, Mizoram University, Aizawl, Mizoram, India.
4. Medhi D, **Das R** (2024) Rock mass characterization and classification along Guwahati Shillong national highway. In: **The 44<sup>th</sup> IIG Annual Meet and International Conference (IIG 2024): Shaping Tomorrow: Society, Culture, and the Environment in an Interconnected World**, Cotton University, Guwahati, Assam, India.
5. Das S, **Das R**, Mazumder D (2024) Simulating the effect of acid rain on the durability of limestone through accelerated weathering test. In: **The 44<sup>th</sup> IIG Annual Meet and International Conference (IIG 2024): Shaping Tomorrow: Society, Culture, and the Environment in an Interconnected World**, Cotton University, Guwahati, Assam, India.
6. Mazumder D, **Das R**, Das S (2024) Investigating physico-mechanical properties of Bhuban shale and their impact on landslides amidst rapid urbanization in Aizawl, Mizoram. In: **The 44<sup>th</sup> IIG Annual Meet and International Conference (IIG 2024): Shaping Tomorrow: Society, Culture, and the Environment in an Interconnected World**, Cotton University, Guwahati, Assam, India.
7. **Das R**, Das S, Singh TN (2023) Bedding-controlled landslide hazard in Assam Arakan Fold belt: A case study from Aizawl, Mizoram, India. In: **1<sup>st</sup> SLRMES Conference on Rock Mechanics for Infrastructure and Geo-Resources Development - an ISRM Specialized Conference**, Colombo, Sri Lanka, pp 83-84, [ISBN: 978-624-6506-00-1]
8. **Das R**, Phukon P, Niyogi A (2022) Numerical Modelling Approach to Evaluate Debris Slide: A Case Study from the North East Himalaya, India. In: Ghosh S, Mandal HS (Eds) **36<sup>th</sup> International Geological Congress**, Geosciences: The Basic Science for a Sustainable Future (The Volume of Abstracts). Geological Society of India, Bengaluru, New Delhi, pp 3274–3275, [ISBN: 978-93-80998-45-9]

9. Niyogi A, Sarkar K, **Das R**, Singh TN (2022) Evaluation of Rockfall Risk Potential Using Rigid Body Model Along National Highway 66 Near Ratnagiri, Maharashtra, India. In: Ghosh S, Mandal HS (Eds) **36<sup>th</sup> International Geological Congress**, Geosciences: The Basic Science for a Sustainable Future (The Volume of Abstracts). Geological Society of India, Bengaluru, New Delhi, pp 3215–3216, [ISBN: **978-93-80998-45-9**]

### **Selected Seminars/Conferences Attended**

1. **ICGEID 2024**: 2<sup>nd</sup> International Conference on Geotechnical Issues in Energy, Infrastructure and Disaster Management, IIT Patna, Bihar, India, 18-20, Jan 2024.
2. **SLRMES 2023**: 1<sup>st</sup> SLRMES Conference on Rock Mechanics for Infrastructure and Geo-Resources Development - an ISRM Specialized Conference, Colombo, Sri Lanka, 3-7, Dec 2023.
3. **DRVC 2023**: 5<sup>th</sup> International Disaster Risk and Vulnerability Conference, Kerala, India, 19-21<sup>st</sup> Jan 2023.
4. **INDOROCK 2017**: 7<sup>th</sup> Indian Rock Conference, New Delhi, India, ISRM TT, 25-27<sup>th</sup> Oct 2017.
5. **ARMA 2017**: 51<sup>st</sup> US Rock Mechanics/Geomechanics Symposium, San Francisco, California, USA, 25-28<sup>th</sup> Jun 2017.
6. **ISRM, Recent Advances in Rock Engineering (RARE-2016)** Bengaluru, India, ISRM, 16-18<sup>th</sup> Nov 2016.
7. **INDOROCK 2016**: 6<sup>th</sup> Indian Rock Conference, Mumbai, India, ISRM TT, 17-18<sup>th</sup> Jun 2016.

### **MSc Dissertation supervision**

Sl No.	Name of the Student	Dissertation topic	Year
9	Prajjalita Devi (GLY2362016)	Comparison of liquid limit measurements of soil using the Casagrande method and Cone Penetrometer method	2025
8	Pragya Das (GLY2362014)	Time-dependent variation in the degree of saturation of rocks: a study on water absorption and desaturation behavior	
7	Chayanika Chelleng (GLY2362013)	Evaluation of strength characteristics of rocks using block punch index (BPI) test	
6	Bishmoy Sonowal (GLY2362005)	Rock mass characterization and classification along Shillong-Dawki (NH-40) National Highway	
5	Priyom Pankhi Handique (GLY2262014)	The effect of high temperature on tensile strength of Sandstone: An experimental study	2024
4	Ipshita Bezbaruah (GLY2162018)	Characterizing the physico-mechanical properties of rocks found along the Guwahati-Shillong National highway	2023
3	Jintu Moni Nath (GLY2162012)	Evaluation of geotechnical properties of Meghalayan Khasi Greenstone (Metadolerite) for suitability as a building stone	
2	Dhritismita Medhi (GLY2162014)	Rock mass characterization and classification along Guwahati Shillong national highway	
1	Debasish Mazumder (GLY2162019)	Simulating the rockfall hazards for different rock types of North-east India: An experimental study	

### **Faculty induction / Orientation programme / Refresher course completed**

1. Completed 4-week Faculty Induction/Orientation Programme from Teaching Learning Centre, Ramanujan College, University of Delhi under the aegis of Ministry of Education, Government of India, PMMMNMTT Scheme (17 Sept - 16 Oct 2021)
2. Completed 1-month Faculty Induction Programme (FIP) from UGC – Human Resource Development Centre, University of Allahabad (7 Nov - 6 Dec 2022)
3. Completed 2-week Refresher course in Earth Sciences and Allied Subjects (Multidisciplinary) of UGC-Human Resource Development Centre, NEHU, Shillong (19 Feb - 02 Mar 2024)

