

Curriculum Vitae



Soukat Kumar Das

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BASIC DETAILS

Name of the Candidate	: Soukat Kumar Das, Ph.D.
Name of the Post	: Assistant Professor, Geotechnical Engineer (R & D), Computational Geomechanics, Lecturer
Major Areas of Interest	: Computational Geomechanics, Geotechnical Engineering, Energy Storage, Rock Mechanics, Soil Mechanics, Granular Mechanics
Years of Experience	: 3.5 years post Ph.D.
Current Organisation	: NIT Rourkela, Rourkela, Odisha, India
Current Location	: Rourkela, Odisha
Gender	: Male
Date of Birth	: 10/12/1990
Highest Qualification	: Ph.D.
Major / Specialization	: Civil Engineering
Email Id	: soukatkumardas@gmail.com ; dassoukat@nitrkl.ac.in
Current Address	: CE 207B, ICS Building, NIT Rourkela, Rourkela, Odisha, 769008, India
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LinkedIn Profile	: linkedin.com/in/soukat-kumar-das-ph-d-5b5b3139
Google Scholar	: https://scholar.google.com/citations?user=PmB0hQ8AAAAJ&hl=en
Total Citations	: 87
h index	: 5

EDUCATION

PhD Indian Institute of Technology Kanpur (CGPA: 9.23/10) Kanpur, India
 PhD, Civil Engineering, Graduated with first class (2021) July 2015-Dec 2021
 Thesis title: Micro- and macro-aspects of strain rate dependent response of crushable granular materials

Indian Institute of Technology Roorkee (CGPA: 8.545/10) Roorkee, India
 M. Tech., Civil Engineering, Graduated with first class (2015) July 2013- Oct 2015
 Thesis title: Numerical Modelling of Prestressed Geogrid Reinforced Soil

Jadavpur University (CGPA: 7.92/10) Kolkata, India
 B.E., Civil Engineering, Graduated with first class (2013) July 2009- Dec 2013

RESEARCH INTERESTS	<ul style="list-style-type: none"> • Constitutive modelling of Geo-materials • Sustainable Ground Improvement Methods • Computational Geomechanics • Geotechnical Engineering • Wellbore Geomechanics • Energy Storage • Coastal Barrier protection • Geothermal energy and carbon sequestration • Granular mechanics and 3D printing • Artificial intelligence (AI) and Machine learning (ML)
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RESEARCH EXPERIENCE

National Institute of Technology Rourkela (NIRF #16) **June 2023-Present**
 Department of Civil Engineering
 Position: Assistant Professor

King Abdullah University of Science and Technology (KAUST) Thuwal, Saudi Arabia
 (QS#27, Nature Index #18) January 2022-June 2023
 Postdoctoral Fellow; Advisor: Dr Thomas Finkbeiner
Wellbore rock mechanics and Unconventional energy recovery systems

Indian Institute of Technology Mandi Mandi, India
 Research Associate; Advisor: Dr Mousumi Mukherjee January 2021-April 2021
Comparison between Perzyna and Consistency viscoplastic model

Indian Institute of Technology Kanpur (CGPA: 9.23/10) Kanpur, India
 PhD. Scholar; Advisor: Dr Arghya Das July 2015-June 2021

- *Rate-dependent response of crushable granular assembly*

Indian Institute of Technology Roorkee (CGPA: 8.545/10)
 M.Tech; Advisor: Prof. N. K. Samadhiya
Numerical modelling of prestressed geogrid reinforced layered soil

Roorkee, India
 July 2013- June 2015

RESEARCH SUPERVISION

National Institute of Technology Rourkela (QS # 291-300, NIRF #16) **June 2023-Present**
Ongoing (2024-2025)

- Coupled CFD-DEM analyses of fluid injection during hydraulic fracturing (PhD)
- Granular Coastal Barrier
- Geothermal pile modelling

Completed (2023-2024)

- Prediction of Shear Strength Parameters using Machine Learning Techniques (PG)
- Stress-strain behaviour of stone column by 3D discrete element modelling (PG)
- Size and shape effect in granular samples using large direct shear tests (UG)
- DEM modelling of rover soil interaction in extraterrestrial surfaces (PG)
- Understanding the role of particle crushing on slope failure (PG)
- THM modelling of carbon sequestration in saline aquifer (PG)
- DEM modelling of the direct shear test under dynamic normal load (UG)
- Understanding the strength deformation behaviour of GGBS under sharing (UG)

R & D PROJECTS

- *Adaptive Coastal Barriers: Optimizing Energy Dissipation Through Engineered Crushable Granular Materials Using FEM-DEM Coupled Simulations- Coalition for Disaster Resilience Infrastructure (CDRI)- 15000 USD- 06/2025-06-2026*
- NIT Rourkela Seed Fund (Rs 2 Lakhs) (Jan 2024-Jan 2027): *Rate-dependent fault rupture in subduction megathrusts considering crushing of gauge material- A numerical study*

ONGOING COLLABORATIVE PROJECTS

- **PURDUE UNIVERSITY USA** (May 2024-Present)
 - *Understanding the molecular dynamics of granular crushing*
- **NIT AGARTALA** (July 2022- Present)
 - *Decoding the micro-macro-mechanics of granular assembly subjected to direct shear test*
- **IIT KANPUR** (August 2022- Present)
 - *Modelling rate-dependent pile penetration in crushable granular media*
- **IIT ROORKEE** (September 2022- Present)
 - *Modelling rate-dependent response of reinforced soil foundation using a constitutive model*
- **KAUST KSA** (October 2022- Present)
 - *Understanding the effect of drill-string-induced vibrations on wellbore stability*
- **LA TROBE UNIVERSITY AUSTRALIA** (May 2023-Present)
 - *Understanding the micromechanics of rubber sand mixture for geotechnical applications*

TEACHING EXPERIENCE

National Institute of Technology Rourkela
Department of Civil Engineering
Assistant Professor

- *AI in Civil Engineering*
- *Environment and Safety engineering*
- *Mechanics of Soil*
- *Engineering Mechanics*
- *Computer-Aided Design*

Rourkela, India
 July 2023-Present

Autumn 2025-2026

Autumn, Spring 2023-2024

Spring 23-24, 24-25

Spring 2024-2025

Autumn 2024-2024

Indian Institute of Technology Kanpur
Department of Civil Engineering

Kanpur, India
 July 2015- June 2021

Course Tutor

Computational Methods in Engineering

July-November 2019

Design of Foundation

January-April 2018

Computational Methods in Engineering

June-July 2017

Teaching Assistantship (TA)

Application of Geotechnical Engineering

July-November 2018

Computational Methods in Engineering

July-November 2017

Mechanics of Solids

January-April 2017

Computational Methods in Engineering

July-November 2016

ADMINISTRATIVE EXPERIENCE

Faculty Advisor to B.Tech 2nd Year Civil Engineering Guiding and Advising students on academic issues	NIT Rourkela July 2024-July 2025
Professor in Charge (PIC) for Weak Students Taking care of academically weak students	NIT Rourkela July 2024-July 2025
Department Representative Member to Central Library Department representative to the central library	NIT Rourkela July 2024-July 2025
Faculty in Charge (FIC) for Surveying Lab Taking care of the operation of the surveying lab and organisation of survey camps	NIT Rourkela July 2024-July 2025
Faculty Advisor to B.Tech 1st Year Civil Engineering Guiding and Advising students on academic issues	NIT Rourkela July 2023-July 2024

Department Representative Member to Central Library Department representative to the central library	NIT Rourkela July 2023-July 2024
Faculty in Charge (FIC) for Surveying Lab Taking care of the operation of the surveying lab and organisation of survey camps	NIT Rourkela July 2023-July 2024

LEADERSHIP EXPERIENCE

Emerging Developments in Geotechnical Engineering Convener: 5 Days Short term Course	NIT Rourkela March 2025
Computer Applications in Geotechnical Engineering Co-Convener: 5 Days Short term Course	NIT Rourkela July 2024
Symposium on recent advances in sustainable geotechnics, IIT Kanpur Member, Student Organising Committee	Kanpur, India October 2019
<ul style="list-style-type: none"> Organized four days symposium on recent advances in geotechnics Managed 100 participants from across India from at least 20 colleges 	
Workshop on Sustainable Geotechnics, IIT Kanpur, India Student Organising Committee	Kanpur, India October 2017
<ul style="list-style-type: none"> Organized two days workshop on sustainable geotechnics Managed 50 participants from across India from various institutes. 	
Internship at NIT Agartala construction site, Agartala, India Nagarjuna Construction Company	Agartala, India June 2012

ACADEMIC SKILLS

- PFC 2D/3D (Discrete Element Method)
- ABAQUS (Finite Element Method)
- MATLAB (Programming and Numeric Computation)
- PLAXIS 2D/3D (Geotechnical Modelling)
- COMSOL (Multiphysics Modelling)
- ANSYS (Finite Element Method)
- PYTHON
- CODE_BRIGHT
- YADE
- LAMMPS

PROFESSIONAL ASSOCIATIONS

- Indian Geotechnical Society (Life Membership)
- Society of Petroleum Engineers

LIST OF PUBLICATIONS

JOURNALS

Published:

1. **Das, S. K.**, and Samadhiya, N. K. (2025). “A 3D finite element study on prestressed geogrid reinforced soil.” *Sādhanā*, Springer India, 50(3), 144.
2. Saqib, M., **Das, S. K.**, & Das, A. (2025). Strain rate-dependent undrained response of a coral sand. *Géotechnique Letters*, 15(1), 19–24.
3. **Das, S. K.**, & Das, A. (2025). Viscoplastic modelling of rate-dependent pile penetration in crushable sand. *Granular Matter*, 27(1), 16.
4. **Das, S. K.**, & Abuel-Naga, H. (2024). Effect of Rate-Dependent Breakage on Strength and Deformation of Granular Sample—A DEM Study. *Minerals*, 14 (11), 1–21.
5. Chowdhury, S., **Das, S. K.**, & Ghosh, S. (2024). Numerical study on microscopic behaviour of non-crushable cemented granular media subjected to direct shear test. *International Journal of Geotechnical Engineering*, 18(1), 101–117.
6. **Das, S. K.**, Verma, S. K., & Das, A. (2022). “Numerical assessment of effects of strain rate on the critical state of crushable sand”. *Geotechnique Letters*, 12(1), 8–13.
7. **Das, S. K.**, & Das, A. (2022). “A critical state based viscoplastic model for crushable granular materials.” *Soils and Foundations*, 62(1), 101093, 1-16.
8. **Das, S. K.**, & Das, A. (2020). “Strain-rate-dependent energy redistribution during isotropic confined comminution.” *Géotechnique Letters*, 10(4), 542–549.
9. **Das, S. K.**, & Das, A. (2019). “Influence of quasi-static loading rates on crushable granular materials: A DEM analysis.” *Powder Technology*, 344, 393–403.

CONFERENCE (SELECTED)

1. Chorapalli, J. V. K., and **Das, S. K.** (2025), *Sustainable Method for Determining Shear Strength Parameters by Machine Learning*, 1st International Conference on Net-Zero Built Environment, Oslo, Norway [DOI: https://doi.org/10.1007/978-3-031-69626-8_122]
2. Hosanna, A. J., and **Das, S. K.** (2024, December), *Impact of Hydromechanical Conditions on Slope Stability: A Finite Element Analysis*, Indian Geotechnical Conference (2024), Chhatrapati Sambhaji Nagar, Maharashtra, India.
3. Chorapalli, J. V. K., Thummala, S., and **Das, S. K.** (2024, December), *Optimizing Cemented Stone Columns: An Integrated DEM and Machine Learning Approach*, Indian Geotechnical Conference (2024), Chhatrapati Sambhaji Nagar, Maharashtra, India.
4. Sahu, D., and **Das, S. K.** (2024, December), *Effects of Extraterrestrial Soil Simulant Properties on Rover Wheel Performance - A DEM Analysis*, Indian Geotechnical Conference (2024), Chhatrapati Sambhaji Nagar, Maharashtra, India.
5. Thummala, S., **Das, S. K.**, and Sahu, D. (2024, December), *Analysis of Interparticle Interactions and Stress-Deformation Behaviour of Stone Columns in Clayey Soils: A DEM Study*, Indian Geotechnical Conference (2024), Chhatrapati Sambhaji Nagar, Maharashtra, India.

6. Rahul, V., and **Das, S. K.** (2024, December), *Influence of Rock Heterogeneity on Carbon Sequestration*, Indian Geotechnical Conference (2024), Chhatrapati Sambhaji Nagar, Maharashtra, India.
7. **Das, S. K.** (2024, July), *Rate-Dependent Confined Crushing in Granular Media*, In: Geotechnical Engineering Challenges to Meet Current and Emerging Needs of Society, Lisbon, Portugal, CRC Press, London, pp. 428–432.
8. **Das, S. K.**, Albahrani, H., Bathija, A. P., and Finkbeiner, T. (2023, October 29-31), *How Geomechanics Controls Drillstring Vibration Induced Wellbore Damage*, International Geomechanics Symposium, AlKhobar, Saudi Arabia.
9. **Das, S. K.**, Albahrani, H., Bathija, A. P., and Finkbeiner, T. (2023, February 19-23), *Minimizing Drill-String-Induced Wellbore Instability*, SPE (Ed.), SPE Middle East Oil and Gas Show and Conference, MEOS, Proceedings, Bahrain.
10. **Das, S. K.**, and Samadhiya, N. K. (2022), *A Numerical Parametric Study on the Efficiency of Prestressed Geogrid Reinforced Soil*, 2nd International Conference on Energy Geotechnics, La Jolla, USA.
11. Pandey, B. K., **Das, S. K.**, and Kumar, S. (2019), *Study of Prestressed Geotextile Reinforced Sand Supporting an Embedded Square Footing*, Indian Geotechnical Conference (IGC) 2019, Surat, Gujarat, India.
12. **Das, S. K.**, and Das, A. (2020, February), *A DEM Study on the Rate-Dependent Volumetric Response of Non-Crushable Sand*, Applied Numerical Modeling in Geomechanics, Billiaux, Hazzard, Nelson & Schöpfer (Eds.), Vienna, Austria.
13. **Das, S. K.**, and Das, A. (2018, April), *Micromechanical Insights of Strain Rate Effect on Crushable Granular Materials*, Micro to MACRO Mathematical Modelling in Soil Mechanics, Reggio de Calabria, Italy.
14. **Das, S. K.**, and Samadhiya, N. K. (2016, August), *Numerical Modelling of Prestressed Geogrid Reinforced Soil for Adjacent Square Footing*, Geo-Chicago, Chicago, USA.
15. **Das, S. K.**, and Samadhiya, N. K. (2015, December), *Numerical Modelling of Prestressed Geogrid Reinforced Soil under Different Conditions*, 50th Indian Geotechnical Conference, Pune, Maharashtra, India.
16. **Das, S. K.**, and Samadhiya, N. K. (2015, May), *Prestressed Geogrid Reinforced Soil—A Numerical Study*, 2015 Young Geotechnical Engineers' Symposium on Finite Element Methods (YGESFEM), Mumbai, Maharashtra, India.
17. **Das, S. K.**, and Samadhiya, N. K. (2015, October), *Numerical Modelling of Prestressed Geogrid Reinforced Soil*, International Conference on Geo-Engineering and Climate Change Technologies for Sustainable Environmental Management (GCCT-2015), India.

BOOK CHAPTER

1. Chorapalli, J. V. K., and **Das, S. K.** (2025), Sustainable Method for Determining Shear Strength Parameters by Machine Learning, 1st International Conference on Net-Zero Built Environment, Springer, Oslo, Norway. https://doi.org/10.1007/978-3-031-69626-8_120

2. **Das, S. K.** (2024, July), Rate-Dependent Confined Crushing in Granular Media, In: Geotechnical Engineering Challenges to Meet Current and Emerging Needs of Society, Lisbon, Portugal, CRC Press, London, pp. 428–432. <https://doi.org/10.1201/9781003431749>
3. Pandey, B. K., **Das, S. K.**, and Kumar, S. (2019), Study of Prestressed Geotextile Reinforced Sand Supporting an Embedded Square Footing, Indian Geotechnical Conference (IGC) 2019, Springer, Surat, Gujarat, India. <https://doi.org/10.1007/978-981-33-6466-0>

SELECTED AWARDS AND HONORS

- MHRD SRF Fellowship July 2017-June 2020
- MHRD JRF Fellowship July 2015- June 2017
- MHRD M.Tech. Fellowship July 2013- June 2015
- Central sector scheme of scholarship July 2009- June 2013

ACADEMIC ACHIEVEMENTS

- | | |
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| PhD. | June 2021 |
| • Overall Class Rank | 1st |
| M.Tech | May 2015 |
| • Overall Class Rank | 3rd |
| Graduate Aptitude in Engineering Test (GATE) | Feb 2013 |
| • All India Rank (Out of 68000 students) | 202 |
| West Bengal Joint Entrance Test | June 2009 |
| • All India Rank (Out of 150000 students) | 676 |
| School Final (TBSE) | June 2007 |
| • All-State Rank (Out of 45000 students) | 10 |

LIST OF REFERENCES

- | | | |
|---|--|--|
| <p>1. Dr Arghya Das
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Associate Professor
Department of Civil Engineering
IIT Kanpur
Kanpur, India, 208016
Phone: +91-512-259-6978
Email: arghya@iitk.ac.in</p> | <p>2. Prof Thomas Finkbeiner
(Postdoc Supervisor)
Research Professor
ANPERC, PSE
KAUST
Thuwal, Saudi Arabia, 23955
Email:
thomas.finkbeiner@kaust.edu.sa</p> | <p>3. Prof N. K. Samadhiya
(M.Tech. Supervisor)
Professor
Department of Civil Engineering
IIT Roorkee
Roorkee, India, 247667
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narendra.samadhiya@ce.iitr.ac.in</p> |
| <p>4. Prof Hossam Abuel-Naga
(Research Collaborator)
Professor and HOD
Engineering Department
La Trobe University, Australia
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