

Geo-Innovation Challenge

Intervention of Geospatial Technology for Water Resources

3 to 5 October 2024



आपो हिष्ठा मयोभुवः

Organized by

**Surface Water Hydrology Division,
National Institute of Hydrology,
Roorkee, Uttarakhand, India**



सत्यमेव जयते
Department of Science & Technology
Govt. of India

Supported by

**National Geospatial
Program, Department of
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New Delhi**



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The Geoinnovation Challenge Program

In India's recent journey of sustainable economic growth, knowledge India has adopted a new information regime through its 'Digital India' program to support good governance, sustainable development goals and empowerment of its citizens. The challenges on our developmental path include inclusiveness, transparency, efficiency, and productivity, all while striking a delicate balance between economic growth and sustainable development. Geospatial technologies have emerged as powerful enablers over the last three decades, contributing significantly to addressing these challenges.

Innovations in geospatial technologies are crucial for enhancing governance and system efficiency. While these technologies have found widespread adoption across various sectors, true economic and social value emerges through innovation. Whether it's in the realms of food and water security, environmental sustainability, health, disaster risk reduction, location-based services, infrastructure and development planning, governance enhancement, or monitoring the Sustainable Development Goals (SDG), the integration of geospatial technologies with artificial intelligence, IoT, big data, and more opens up a world of possibilities.

The Geo Innovation Challenge Program is not just a competition; it's a repository of ground breaking ideas that have the potential to shape our future. We invite participants to contribute ideas that go beyond conventional boundaries, proposing innovative solutions that merge geospatial technologies with cutting-edge advancements charting the course for a brighter future!

Apply now to be a catalyst for positive change!

About the National Geospatial Program of the Department of Science and Technology, Government of India

In the heart of India's technological advancement lies the National Geospatial Programme (NGP) of the Department of Science and Technology, Government of India. The Geospatial Capacity Building Program initiated in 2010 has over the years flourished, fostering capacities in geospatial science, technology, solutions, and entrepreneurship. Its transformative journey initiated with a modest ambition has evolved into a robust program, igniting minds and expanding horizons.

For a decade, the Geospatial Capacity Building Program under DST has been a cornerstone, conducting 166 comprehensive three-week programs conducted as Summer and Winter Schools in Geospatial Technologies at a basic (Level 1) and advanced level (Level 2). The 2024 cycle includes a 11 three week Level 1-(Standard) programs, 4 three week Level 1-(Spatial Thinking) programs, 8 Level 2-(Advanced) three week programs and 7 Geo Innovation Challenge Programs being conducted by various Universities across India selected through a stringent process by the DST.

The sessions at these programs comprise classroom, lab, fieldwork, and mini-projects. Central to this success is a structured curriculum and the advocacy of open-source software. The dedicated portal, <https://dst-iget.in>, is a reservoir of learning materials, connecting educators, professionals, and scientists, and catalyzing India's geospatial domain. The NGP-DST's geospatial capacity building program is coordinated nationally by the Bharati Vidyapeeth Deemed University, Department of Geoinformatics, Institute of Environment Education and Research, Pune.

The National Institute of Hydrology, Roorkee, Uttarakhand is one of the selected institutions for conducting the Geo Innovation Challenge Program.

National Institute of Hydrology, Roorkee, Uttarakhand

National Institute of Hydrology (NIH) is a premier Research and Development organization under the Ministry of Jal Shakti, Department of Water Resources, River Development and Ganga Rejuvenation, Government of India. It was established as an autonomous society in 1978 with its headquarters at Roorkee. The main objectives of NIH are to undertake, aid, promote and coordinate systematic and scientific work in all aspects of hydrology. The Institute was declared as an S&T organization in 1987. Seven Regional Centers of the Institute are located in different physiographic regions of the country. The scientific and technical credibility of the Institute in conducting hydrological and water resources research is well recognized both at the national and international level. Visit us on : www.nihroorkee.gov.in

Surface Water Hydrology Division

The Division is carrying out R&D on various aspects of surface water hydrology. The thrust areas of research of the Division are: (i) hydrological modelling; (ii) water availability analysis, flow duration curve analysis and environmental flow requirement; (iii) design flood estimation; (iv) hydrodynamic modelling of rivers for preparing flood mitigation plans; (v) flood inundation modelling and flood hazard assessment; (vi) snow and glacier melt monitoring and modelling; (vii) urban hydrology; (viii) watershed management studies; (ix) drought mitigation and management; (x) impact of climate change on water resources. The Division is carrying out sponsored and consultancy studies and under technology transfer program, the Division organizes seminars/ symposia/ training courses/ workshops. In pursuance of various R& D activities the Division has made interactions with CWC, CGWB, GFCC, IMD, IITM, NHPC, CPCB, DST, NPCIL, NTPC, NSPCL, THDC, IITs, GMDA, RVNL, VMC,

AUD, NEEPCO, NGPC and various other academic as well as R & D institutions and state water resources departments etc.



National Institute of Hydrology, Roorkee, Uttarakhand, India

Details of the Geo Innovation Challenge

The Geo Innovation Challenge aims to recognize, encourage, and nurture innovation among the youth of our nation. It serves as a platform for ideas that could evolve into full proposals, potentially receiving support from the Department of Science and Technology (DST) in the future.

Who can participate in the Geo-Innovation Challenge?

Candidates having or pursuing Doctoral / Masters/ Bachelors degree in any field from any recognized university under the age of 40 years with innovative original ideas OR Individuals under the age of 40 years with industry or field experience and innovative original ideas without the above required qualification are eligible to apply. The candidates whose ideas are selected for presentation can participate in the event.

Do I need to have studied/ be studying Geospatial Science/ Geoinformatics to be eligible to apply?

Not at all! We strongly encourage candidates from all fields of study to apply and bring their innovative ideas on development and use of geospatial science and technology for the socio-economic development of the country. You could also team up with a member from a completely different field or somebody who is into geospatial technologies to develop your idea and apply!

Do I have to submit a project proposal?

No, you do not have to submit a project or a project proposal. You need to submit idea(s).

What is the difference between an Idea and a Project Proposal?

Any project begins with an idea. An idea lays the foundation stone for the starting of a project. In other words, without an idea there can be no project. In other words, without an idea there can be no project.

An idea forms the basis to either solve an impasse or to improve on how things are done. It's a creative process of coming up with possible solutions that address societal needs and problems. A project further develops the idea, its viability, its structure, its implementation, etc. We strongly encourage participants to submit ideas (introduce something new) and NOT project proposals. For example, the United Nations Sustainable Development Goals provide a good framework and starting point to address poverty, gender equality, environment protection, infrastructure development, etc.

All of these can benefit by the spatial perspective that geospatial technologies provide. Don't worry about how big or the big picture. We need thousands of ideas, both big and small, to ensure that the goals are met and to build a better world !

What is Innovation?

Innovation is a new idea or a method that is translated into a product or a service that creates value. The real essence of innovation is improvement – the ability to create something better that serves as a source of collective well-being, economic growth and sustainable development.

Can I team up when submitting my idea?

Yes. However there can be a maximum of two participants in a team,. If you are a team, make sure both the participants apply for the challenge and register for the same.

What if only I can be present at the Geo-Innovation Challenge?

Only one of you will be funded to attend the event. The second person may attend the event online. Participation of at least one person physically is mandatory.

What is the purpose of conducting this Geo-Innovation challenge?

The Geo-Innovation challenge will serve as a repository of ideas leading to Call for Proposals by the Department of Science of Technology (DST), Government of India, in future. The ideas generated will be used for inviting 'Call for Proposals' by DST in future. The top three ideas with names of the participants will be displayed on the DST website. Our primary goal is to support viable ideas that have potential to create unique products, services and methods, ultimately enhancing the life of people and contributing to sustainable development. The PIs of the respective institution selected to conduct the Geo Innovation Challenge are conducting the Geo Innovation Challenge based on specific themes. Kindly go through the dst-iget portal and read the themes carefully before applying.

Can I submit an idea even if my area of research is not fully related to Geospatial technologies?

Yes. We suggest you team up with someone from the geospatial background to check the feasibility of realizing your idea. New knowledge can only be generated when we move out of our silos and work with interdisciplinary teams combining different strengths.

I am a student of B.Tech./M.Tech./ M.Sc./B.Sc./etc. , do I qualify?

Yes.

What kind of ideas can I submit?

The Geo-Innovation Challenge program addresses different broad themes as given below. You could submit an idea related to any of the themes/ sub themes. Kindly check the brochures of the individual institutions for the theme.

What happens if my idea is short-listed?

The shortlisted participants will have to present their ideas in the Geo-Innovation Challenge in person (one team member). Once shortlisted you will have to submit 1000 words essay covering the points given in the following pages and you will need to travel to the University to present it at a three day event. Dates of all of the above are mentioned in this brochure.

Do I actually have to create my idea / work through all the details?

Remember idea is akin to a concept. A project proposal is a detailed plan. We expect ideas. You can just explain your idea using the guidelines provided. Having visuals in the presentation is encouraged and that may include a sketch, picture or even a prototype, work flow, etc.

How will the ideas be awarded?

- The three top innovative ideas will be awarded cash prizes and a certificate with an opportunity to be mentored in developing the idea into a full proposal/business proposition. Such candidates may also further develop the full project proposal and submit to DST, subject to eligibility, when the 'Call for Proposals' is released by DST.

First Prize: Merit Certificate and INR 12000/-

Second Prize: Merit Certificate and INR 8000/-

Third Prize: Merit Certificate and INR 5000/-

- A Compendium with all the innovative ideas will be published by DST on the website

What tips can you give for improving my submission?

- Your writing and presentation should be clear, highlighting the problem identification process, current status, need for innovation and the innovation itself.
- Highlight the uniqueness.
- Clearly explain how the idea is different from what is already available.
- Describe your innovation as comprehensively as possible.
- Make it easy for the jury to assess your idea.
- Pitch well: How well can you convince the jury of your idea. Identify market/industry potential, social Impact, etc. and explain what is needed to move the idea closer to completion, as a product or tool or research project.
- Remember that the bright ideas should have clearly identified the idea, the market, the problem being solved or business case, the technology needed, and the next steps to develop or commercialize the idea, and submission of facts.
- What problem is your idea addressing? (Remember the problem could be societal, or in technology development, or in the development of a scientific concept, which can have an impact towards sustainable development)

- What is the current status?
- What is the proposed innovation?
- What will be its impact on any aspect of sustainable development or betterment of life of people?
- What is the proposed innovation?
- What will be its impact on any aspect of sustainable development or betterment of life of people?

Remember: DO NOT submit any research work/ algorithms to be used and/or results associated. We are mainly focusing on new ideas.

How the idea will be evaluated?

The submitted ideas will be evaluated based on the following: Significance of the idea in solving an issue/problem, its innovative component and probable impact on sustainable development goals, adequacy in problem identification, novelty and innovation in the idea, relevance to the theme of the Geo-Innovation Challenge, approaches proposed, feasibility of the idea in producing disruptive technologies and impact in the area under consideration.

How to apply?

1. The first step is to send a 300-words abstract briefly mentioning about your idea, innovation versus current status, and how it can address an existing problem. Apply through the portal <http://dst?iget.in>. Upload the following documents as a single pdf

- Abstract (not more than 300 words) clearly stating the title of your idea, need for the proposed innovation, the key idea using geospatial technology, keywords and names of team members, email ids/mobile nos. (max. 3 team members)
- Your identity card /s from the institution where you are currently working/ studying which clearly mentions the validity.
- Your Google Scholar Id/ LinkedIn Id/ ORCID Id / Researchgate Id (atleast one of these)

2. All participants who have applied will be invited to a one day ONLINE orientation to provide inputs. Following this you will have approximately 20 days to submit your full idea. The full idea (as a 1000 word document) should be submitted directly to the PI of the program where you are applying by the due date mentioned in the brochure.

3. Selected candidates will be informed by mail by the PI. Once selected all further guidelines for presentation will be sent via email by the PI. Candidates should ensure that they are thoroughly prepared for their final presentation.

What are the theme/ (s) subthemes for submitting ideas under the Geo Innovation Challenge Program being conducted by National Institute of Hydrology, Roorkee, Uttarakhand?

Theme: Intervention of Geospatial Technology for Water Resources

Geospatial technologies play a crucial role in enhancing our understanding of water availability, distribution, and quality, which are vital for sustaining life and supporting various human activities. Advanced geospatial techniques have enabled us to identify and map surface water and groundwater resources with precision. Additionally, automated data fusion has become indispensable tools in water resources management. By combining diverse sources of data such as satellite imagery, field measurements, and hydrological models, these technologies offer comprehensive insights into water availability, quality, and usage patterns. Artificial intelligence based hydrological modelling allows for the early detection and mitigation of water-related risks, such as floods, droughts, and contamination events. Real-time monitoring coupled with predictive analytics has become instrumental in mitigating the impact of floods, with flood risk zone mapping and early warning systems providing invaluable assistance in damage assessment and emergency response. Site suitability analysis for rainwater harvesting, categorized land classification using remote sensing, and integrated watershed management strategies are promoting sustainable development practices. Geospatial tools are also instrumental in monitoring water quality, enabling the evaluation of environmental impacts and facilitating informed decision-making.

In response to the significant effects of climate change and land use alterations on water resources, diverse regions are exploring innovative approaches like groundwater augmentation. These efforts aim to promote a more resilient and equitable utilization of water across various geological and agricultural conditions. Moreover, AI-driven technologies, such as machine learning and natural language processing, can enhance citizen engagement and participation in water management efforts. By developing user-friendly mobile applications and interactive platforms, AI enables communities to contribute data, provide feedback, and collaborate with authorities in decision-making processes, promoting a sense of ownership and responsibility towards water resources.

Three-day Geoinnovation program provides a forum for individuals to showcase their ideas and stimulate optimistic change, with an emphasis on long-term sustainable solutions in water resource management which not only enhances decision-making, also promotes sustainable use of water resources, and contributes to the resilience of communities facing water-related challenges.

Important Information

Last date for application on dst-iget portal : 2 August 2024

Online orientation: 09 August 2024

Submission of Full Idea: 29 August 2024

Intimation of acceptance for next round: 15 September 2024

Dates of the program: 3-5 October 2024

Mode of conduct: Offline

No. of seats: 25

Registration Fees: Nil

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Address

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Certificate

A certificate of participation will be awarded to each participant only after attending the full course.

Travel and Lodging

Each participant (if applying singly) and one team member from each team (if applying as a group) will be reimbursed with 3 AC train fare. Lodging and boarding on a double sharing basis will be provided by the host institution.

Infrastructure and Facilities

Laboratory

Remote Sensing and GIS Labs, Nuclear Hydrology lab, Hydrological Instrumentation Lab, Snow and Glacier Lab, Soil and GW lab

Remote Sensing & GIS Lab

Remote sensing and GIS Laboratory carries out studies and research on various aspects of hydrology and water resources using remote sensing and GIS techniques. Software available in the Laboratory include ArcGIS, ERDAS Imagine, ILWIS, ENVI, and R2V (Raster to Vector Conversion software). The laboratory also has A0 Colortrac Smart-F Image Scanner, Laser Colour Printer, A0 size Cannon Colour plotter etc.

Auditorium

NIH has an Auditorium of the capacity of around 200 people.

Lodging and Boarding

While preserving the heritage of "Atithi Devo Bhava", we offer our visitors the best facilities in terms of service, ambience or food. Our Institute has two guest houses to provide accommodation to the guests and delegates visiting NIH.



GIS and Remote Sensing Lab



Auditorium



Guest House



Guest House Room

Deputation Letter (Format) for DST Summer/Winter School/ Geoinnovation Program 2024-25 (Prospective participant must submit this on the letter-head of the respective institution where they are working)

This is to state that Dr./Mr./Ms. _____ working at _____ (name of the institute) as _____ (Designation), since _____ (year) is being deputed/nominated to _____(program name in detail) from -----(date, month, year) to----- (date, month, year) . He/she will be relieved from his/her duties during this period.

Signature and Seal (Head of the Institute)



