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9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

SDG # 9 :: Progress Report : AY 2023 - 24

GITAM University – SDG #9 -Industry, Innovation and Infrastructure - Progress report 2023-24

Introduction:

Sustainable Development Goal 9 (SDG 9) focuses on the critical pillars of industrialization, innovation, and infrastructure. This goal emphasizes the need for robust, resilient, and sustainable infrastructure systems, along with the promotion of inclusive industrialization and technological innovation, to drive economic growth and improve quality of life worldwide. SDG 9 plays a pivotal role in advancing other sustainable development goals, as it focuses on creating the conditions for sustainable industrialization, innovation, and equitable access to infrastructure and technological advancement, which are essential for poverty reduction, education, and overall human development.

Research:

- Research Publications in Scopus Index: GITAM has a relative activity index of 1.61 in its Scopus indexed publications relating to SDG9 during the reference period of 2021-2023.
- **Projects:**

GITAM is supported by DST, UGC-DAE**,** SERB in establishing 11 projects. All these research projects support technological innovation, industrial sustainability, and the development of advanced infrastructure. They focus on a range of industries, including autonomous systems, advanced materials, energy technologies, smart electronics, and manufacturing, with the potential to drive both economic growth and environmental sustainability. By fostering cutting-edge research in these areas, these projects play an important role in achieving SDG 9, particularly in terms of:

- Fostering innovation in traditional and emerging industries.
- Improving industrial processes and systems for greater efficiency and sustainability.
- Supporting the development of smart, resilient, and green infrastructure.
- These projects reflect the growing intersection of science, technology, and industry, helping create sustainable and inclusive growth.

1. Dr. Suresh Kumar Nandigama – Simulation of Data & Communication from Sensors & Subsystems for Bench Testing of AUV Mission Computer. Simulation of sensor data and communication protocols for testing the mission computer in Autonomous Underwater Vehicles (AUVs). This project supports the advancement of autonomous systems and sensor technologies, which are key for industries such as marine exploration, defense, and offshore energy. It directly contributes to the development of innovative and resilient infrastructure used in underwater robotics and sustainable ocean industries.
2. Dr. Sarat Babu Imandi – Science, Technology, and Innovation Hub in Paderu Division, Andhra Pradesh. Establishment of a Science, Technology, and Innovation Hub in a rural area of Andhra Pradesh to foster innovation and technological advancement. This initiative aims to bridge the innovation gap by promoting local industrial development and entrepreneurship in underserved regions. The hub can contribute to inclusive industrialization, fostering sustainable growth and providing opportunities for local communities in remote areas to access advanced technologies and skills development.
3. Dr. Mohan Kabadi – Information and Technology-Assisted Silk Cocoon Farming for Socio-Economic Upliftment of rural poor. This project demonstrates how information technology can enhance traditional agricultural practices, thereby fostering inclusive industrialization in rural areas. It also promotes technology-driven solutions for sustainable agricultural practices, which are integral to economic development in rural areas.
4. Dr. Saikiran Vadavalli – Direct Femtosecond Laser Irradiation Induced Surface Nanostructuring for Raman and Sensing Applications. Using femtosecond laser technology for surface nanostructuring of materials, with applications in Raman sensing. This research focuses on the development of advanced materials and sensing technologies, which are essential for a wide range of industrial applications, including environmental monitoring, healthcare diagnostics, and industrial quality control. The project contributes to technological innovation and the creation of smart infrastructure.

5. Dr. K. Ramesh Kumar – Understanding Magnetic/Spin Contribution to Seebeck Coefficient in Itinerant Magnetic Systems. Investigating the contribution of magnetic/spin properties to the thermoelectric Seebeck coefficient in materials. This research explores new materials for energy conversion technologies, such as thermoelectrics, which are essential for improving energy efficiency in industries. It contributes to the development of advanced, sustainable technologies for energy generation and smart infrastructure.
6. Dr. K. Ugendar – Effect of YFe1-xCrxO3 Layer on YBCO Critical Temperature for Spintronic Devices. Studying the effects of doping on the critical temperature of YBCO superconductors for spintronic applications. This work is highly relevant to the development of spintronic devices that can significantly improve the performance of electronic systems and quantum computing. Spintronics is an emerging field with applications in advanced manufacturing, quantum technologies, and energy-efficient systems.
7. Dr. Saikiran Vadavalli – Laser and Ion Beam Irradiation Induced Nanostructuring in III-V Nitride Semiconductors. Research on nanostructuring of III-V nitride semiconductors using laser and ion beam irradiation. This research aims to enhance the performance of semiconductors, which are foundational to many industries, including electronics, renewable energy, and telecommunications. It contributes to technological innovation and industrial growth, improving the infrastructure for modern electronic systems.
8. Dr. Chandra Sekhar Angani – Electromagnetic Non-Destructive Testing for Inspection of Magnetic Pulse Welding Joints. Developing non-destructive testing (NDT) techniques to inspect magnetic pulse welding joints. This project addresses the need for advanced testing technologies that ensure the safety and durability of industrial infrastructure. Magnetic pulse welding is a modern technique used in manufacturing high-performance materials, and effective inspection techniques are crucial for the reliability of resilient infrastructure.
9. Dr. Motahar Reza – MHD Instability in Curved Microchannel Flow. Studying magnetohydrodynamic (MHD) instability in curved

microchannels for fluid flow applications. This research could lead to more efficient fluid flow management systems in microfluidics and energy production systems. It has potential applications in areas like cooling systems, chemical processing, and renewable energy, contributing to sustainable infrastructure and industrial efficiency.

10. Dr. Prasun Banerjee – Effect of Bismuth Excess and Iron Deficiency on the Multiferroic Properties of BiFeO3 Ceramics. Investigating how the properties of BiFeO3 ceramics change with excess bismuth or iron deficiency, particularly for multiferroic applications. The project explores new materials with multiferroic properties, which could be used in advanced electronics and spintronic devices, leading to innovations in smart sensors, memory storage, and energy-efficient technologies.
11. Dr. B. Satti Babu – Development of Lead-Free Piezoelectric Composites for Actuator Applications. Developing lead-free piezoelectric composites for use in actuators and other industrial applications. This project focuses on creating environmentally sustainable materials for use in various industrial applications, including actuators, sensors, and energy harvesting systems. It contributes to green technologies and the development of sustainable industrial practices.

Education:

☞ The GITAM's Young Entrepreneurs Program goes beyond traditional education by instilling critical life skills such as creativity, problem-solving, communication, and resilience. Enthusiastic Young people with ideas and who require basic knowledge of how to become entrepreneurs can enrol for this program.

https://www.gitam.edu/school-of-business/young-entrepreneurs-programme

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☞ **Principals of Entrepreneurship (PoE)- PoE** is a super foundational level course aimed at delivering the basics & first principles in Entrepreneurship to the entire GITAM academia. The topics in POE are self-paced, with about 3.5 hours of highly engaging content with real-world examples & use-cases.

- Venture Discovery (VDC111)- VDC111is a mandatory 2-credit foundational & a completely hands-on activity-based course in Entrepreneurship & Innovation for all the first-year year students at GITAM across three campuses, agnostic of the institute of their study. This course is designed by the Northeastern University's Centre for Entrepreneurship Education (NUCEE), Boston. It is driven by highly-qualified and seasoned teaching faculty from various institutes of GITAM with real-world teaching and consulting experience.
- NU-IDEA is our flagship program consisting of three stages as part of the venture-building process. This program helps foster the development of entrepreneurs through a holistic approach to experiential learning. It helps develop an entrepreneur's business from concept to launch. Throughout the entrepreneurs' journey, we also provide various support functions for our ventures like Makerspace, Venture Mentor Network, Prototyping Grant, Design Studio, Seed-fund, Exposure to the local and global startup communities, Open-house pitching sessions, Societal Outreach Programs, Meeting successful entrepreneurs through various events, opportunities to engage in experiential learning, among others.

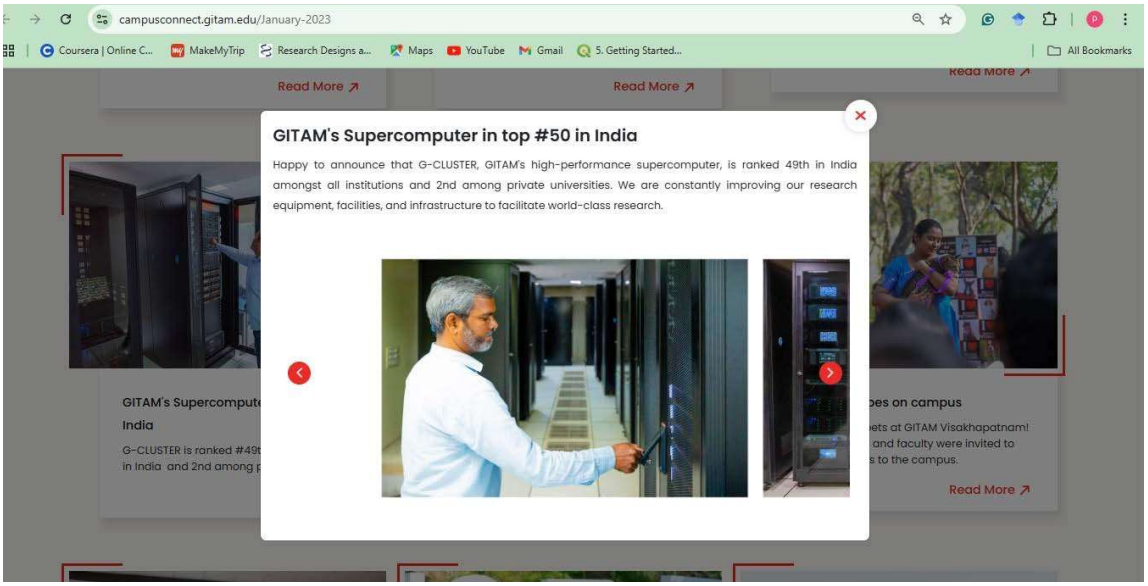
- Ph. D. Program in Entrepreneurship

Key initiatives:

- ***Investment in High Performance Computing system***

https://hpc.gitam.edu/#software

Processors	= Dual Intel® Xeon® Gold 6326 (16 Core / 32 Thread, 2.90 GHz, 24 MB) Processor
RAM	= 256 GB ECC DDR4 3200 MHz configured in a balanced Memory Configuration
HDD	= 96 TB Enterprise SAS
SSD	= 1.92 TB Enterprise SATA
Network	= 100 Gbps high speed and low latency, Dual Gigabit LAN Ports
Management	= IPMI 2.0 with virtual media over LAN and KVM over-LAN support
Expansion	= 4 PCI-E 4.0 x16 (LP) & 2 PCI-E 4.0 x8 (LP)
Ports	= 4 x USB 3.0 Ports & 1 x VGA
Chassis	= 2U Rack mountable
Power	= 1200W Redundant Power Supply with 80 Plus certified



☞ *Establishment of MURTHI Center*

https://www.gitam.edu/research/murti

The Multidisciplinary Unit of Research on Translational Initiatives (MURTI) is a pioneering virtual entity at GITAM, serving as a hub for interdisciplinary research and innovation. MURTI's primary goal is to foster a cross-disciplinary think tank that tackles issues of regional, national, and global significance.

☞ *On Board of Distinguished professors*

GITAM has a policy to bring distinguished professors on board. This policy aims to offer an opportunity to high-performing professors of GITAM as well as external nationally/internationally renowned professors to join the MURTI (Multidisciplinary Unit of Research on Translational Initiatives) facility as distinguished professors. The distinguished professors will conduct extensive research in their areas of interest, provide research-focused leadership and motivation to MURTI Faculty Fellows and others. Their contributions will elevate the university's position as a research-focused institution. This endeavor aims to elevate the institution to global standards and cultivate a world-class ecosystem.

https://iqac.gitam.edu/assets/pdf/Distinguished-Professors-Policy.pdf

List of Distinguished Professors

S.No	Name	Specilised Area
1	Prof.Ch Rama Krishna	Life Sciences
2	Dr.G.Santhanam	Mathematics
3	Dr. Butchi Venkata Rao Tata	Physics
4	Dr. Gurazada Ravi Kumar	Physics
5	Dr.Jagadeesh Bharatam	Physics
6	Dr.Poduri Rama Rao	Pharmacology
7	Dr.Rathin Roy	Public Policy
8	Dr. Patil Dilipkumar Premchand	Mathematics
9	Dr.S.Arun Kumar	Computer Science

Progress:

- GITAM has strongly emphasised multidisciplinary and interdisciplinary research as a key component of its broader efforts to contribute to India's Viksit Bharat vision. Over the past few years, GITAM has secured multiple grants to address global challenges and advance India's knowledge economy. GITAM secured ₹ 28.87 crore in research grants through the Multidisciplinary Unit of Research on Translational Initiatives (MURTI), focusing on areas like molecular biology, food security, and environmental sustainability. These projects address global challenges such as climate change and sustainable agriculture.
- During 2023 GITAM faculty has published 175+ Patens and TWO patents were granted.

Collaborations:

- GITAM partners with iTIC Incubator to support 75 innovators under BUILD initiative. GITAM Deemed-to-be-University's entrepreneurship and innovation cell, Venture Development Centre (VDC) has signed an MoU with iTIC Incubator at IIT Hyderabad to support 75 innovators. iTIC Incubator at IIT Hyderabad, in collaboration with Greenko Group has launched a new programme called Bold and Unique Idea Led Development (BUILD).

Innovations:

- This GITAM student's AI-powered AgriTech solution is unique.
- GITAM students get APSCHE Student Innovation Award from Chief Minister
- The Indian Institute of Technology-Hyderabad (IIT-H) incubator - iTIC has announced a grant of ₹1 lakh each for eight student innovators from Gandhi Institute of Technology and Management (GITAM) a deemed to be university. These students were chosen from over 600 applications.

Recognitions:

- **GITAM's Professor KS Krishna Rao Receives Prestigious Indian Geophysical Union's Lifetime Achievement Award**

GITAM Deemed to be University is proud to announce that Prof. KS Krishna Rao, a Professor and Dean of the GITAM School of Science, GITAM Deemed to be University has been honored with the prestigious Indian Geophysical Union's (IGU) Dr. Hari Narain Lifetime Achievement Award in Geoscience for the year 2024. This esteemed award recognizes Prof. Krishna Rao's exceptional and sustained contributions to the field of Earth and Ocean Sciences, spanning over four decades of dedicated research, teaching, and industry engagement.

Prof. Krishna Rao's research has significantly advanced our understanding of plate tectonics and lithospheric dynamics, particularly in the Indian Ocean region. His expertise has not only enriched the academic world but has also had a profound impact on India's strategic interests, notably in extending the nation's claim on seabed territory beyond the exclusive economic. Prof. Krishna Rao's remarkable career has been marked by numerous accolades, including the JC Bose National Fellowship, the Shanti Swarup Bhatnagar Prize, and Fellowships from the three main Indian science academies – IAS, INSA, and NASI.

The IGU Dr. Hari Narain Lifetime Achievement Award will be presented to Prof. Krishna Rao during the IGU's annual convention at Banaras Hindu University (BHU), Varanasi, in December 2024.

https://newsmantra.in/gitams-professor-ks-krishna-rao-receives-prestigious-indian-geophysical-unions-lifetime-achievement-award/

☞ GITAM Faculty Awarded Prestigious Ramalingaswami Re-entry Fellowships, Strengthening India's Scientific Leadership

Two faculty members from GITAM's School of Science, Dr. Dhrubajyoti Chowdhary Chowdhury and Dr. Aparna Lajmi, have been awarded the prestigious Ramalingaswami Re-entry Fellowships by the Department of Biotechnology (DBT), New Delhi. This recognition, awarded after a highly competitive national selection process, carries significant research grants and support exceeding ₹50 lakhs each. With his background in molecular neuroscience, Dr. Chowdhary Chowdhury aims to contribute to translational research following his experience at leading institutions worldwide. Dr. Lajmi, whose previous work focused on biodiversity and ecological sciences, has added depth to GITAM's ongoing efforts in sustainability research. Their respective fields of expertise complement GITAM's broader mission to address critical national and global challenges.

☞ GITAM Faculty gets Outstanding Faculty in Materials award (2023) from VIFA at Chennai, and Best Presentation Award (2023) in INUP i2i at IIT Guwahati.

Dr. B. Rajesh Kumar is Associate Professor in Physics, GITAM, received Young Achiever Award at RERE-2018 in association with University of Louisville, KY-USA, Young Faculty in Science (2018), Outstanding Faculty in Materials (2023) from VIFA at Chennai, and Best Presentation Award (2023) in INUP i2i at IIT Guwahati.

☞ *GITAM Faculty receives 'Dr. APJ Abdul Kalam Lifetime Achievement National Award'* from the National Institute for Socio-Economic Development

Dr. I.V.Subb Reddy, Associate Professor in Physics has received the *'Dr. APJ Abdul Kalam Lifetime Achievement National Award'* from the National Institute for Socio-Economic Development (R), Bengaluru. It is in recognition of his distinguished contribution to the development of the Nation and achieving outstanding excellence in the field of Teaching, Research and Publications.

Dr. Reddy received several fellowships for advanced research in Atmospheric Sciences viz., UGC Project Fellowship, JRF from Advance Centre for Atmospheric Sciences, Department of Space, SFR from CSIR under the Young and Dynamic Research Scholars.

☞ GITAM Faculty Awarded Best Engineering and Technology Professor Award - 2022

Assistant Professor in Department of Aerospace Engineering of the GITAM Deemed to be University, Hyderabad, Md. Akhtar Khan has received 'Best Engineering and Technology Professor Award-2022' by TPL Shiksha Award, organized at New Delhi.

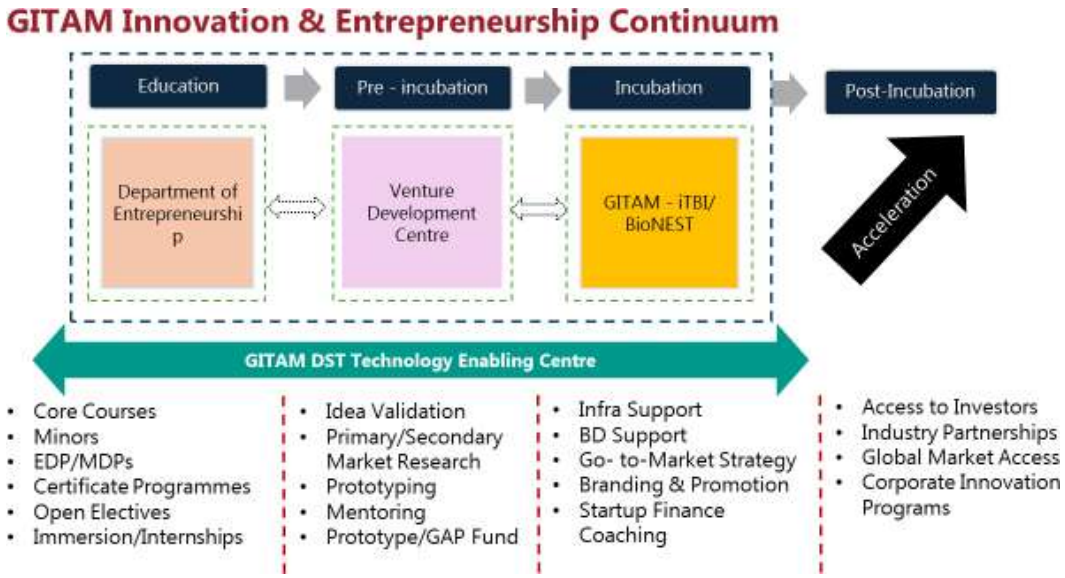
He has published nearly 22 research journal papers in peer-reviewed international journals, including the Reviewer of Scopus Indexed journals and is also an editorial board member of some journals. Earlier also he has been bestowed with other prestigious awards.

https://www.thehindu.com/news/national/telangana/award-to-gitam-faculty/article65876079.ece

Infrastructure:

MURTI & MURTI-SAIF Equipment Details		
Sl. No	**Description of Item**	**Location**
1	SCIEX 5500+ QTRAP Activated System with EXION	Pharmacy Bhavan
2	Biosafety Cabinet	VB Bhavan
3	Lab Refrigerated Incubator	VB Bhavan
4	CFX Opus 96 Real time PCR System & Gene Pulser Xcell Total System	VB Bhavan
5	CO_2 Incubator, Ultra Deep Freezer, Gradient PCR Machine, Non Refrigerated & Refrigerated Centrifuge	VB Bhavan
6	Trans-Blot SD Semi-Dry Electrophoretic Transfer Cell	VB Bhavan
7	Gel-Electrophoresis	VB Bhavan
8	Teaching Equipment	VB Bhavan
9	Autoclave	VB Bhavan
10	CAMC for LC MS MS(additional Warranty charges)	Pharmacy Bhavan
11	Waters XEVO G3 QTOF HRMS System	Pharmacy Bhavan
12	CAMC for QTOF(additional Warranty charges)	Pharmacy Bhavan
13	PCR Cooler	Pharmacy Bhavan
14	Research equipments for MURTI	Pharmacy Bhavan
15	Exhaust system for Water LCMS	Pharmacy Bhavan
16	Gold & Carbon Coaters (attachment to P.O 1500)	Pharmacy Bhavan
17	Nano Drop	VB Bhavan
18	Centrifuge Floor mounted & Bench top	VB Bhavan
19	Gelblot,Ultr Deep Freezer& Incubator shaker	VB Bhavan
20	Biosafety cabinets	VB Bhavan
21	Millipore Water purifier	VB Bhavan
22	Plate readers	VB Bhavan
23	UV-VIS spectrophotometer	VB Bhavan
24	Probe sonicator	VB Bhavan
25	FPLC for Biotech-GSS Vizag	VB Bhavan
26	AVNEO 500MHz NMR Spectrometer with 3 channels & accessories	Pharmacy Bhavan
27	LPI-NMR-055-MRS, 013, 018 and 061 MRS	Pharmacy Bhavan
28	LPI-NMR-009-MRS	Pharmacy Bhavan
29	LPI-NMR-009-MRS	Pharmacy Bhavan
30	Scanning Electron Microscope	Pharmacy Bhavan

Engagement:



VDC – EVENTS

- VDC conducted 280+ events between 2020-2023
  - Innovation & Entrepreneurship MAHOTSAV
  - GITAM Aspire L2M (Lab to Market)
  - Internal Hackathons and Ideathons
  - Smart India Hackathon (SIH)
- Purpose was to engage faculty, students, & scholars to co-create ideas & innovations

GITAM's Flagship Event: The Annual SmartIDEAthon (2021 – 2023)

- No. of applications received : 2500+
- No. of students reached: 26,00,000+
- No. of States and UTs represented : 31
- Total prizes + grants worth : INR 50 Lakhs
- Boston Immersion Trip : 9 Teams

#startupindia

OUTREACH ACTIVITIES

- **VCCI-WW (Vizagapatam Chamber of Commerce & Industry - Women's Wing)**
  - Conducted a 10-week **Basics of Entrepreneurship** program for high school children from 12 schools (2022 & 2023).
- **FUEL (Future Entrepreneurs and Leaders):**
  - Through the IIC ATL Linkages Program partnered with 3 Schools to mentor school students in innovation/entrepreneurship
- **WISE (Women Initiated Social Entrepreneurship)**
  - Coaches & E-Club supported 40 women entrepreneurs from Visakhapatnam Region in enhancing business efficiency (with **VCCI-WW**).
  - Launched 15-day online entrepreneurship development program for 36 women (with **Tata Chemicals Society for Rural Development**).

Way forward:

GITAM is highly committed to contribute for the innovations through its cutting edge research with international and national collaborations, supported by research grants, industry connects and investing on research infrastructure. These accomplishments underscore GITAM's role in addressing national and global challenges, propelling India toward a Viksit Bharat by 2047.