Research

A. Major Thrust Areas of Research

1. Natural Resource Management and Biodiversity Conservation
2. Atmospheric Sciences and Climate Change
3. Rock-Water Interaction
4. Bio-monitoring, Bioremediation and Bio-fuels
5. Remote Sensing and Geo-information System

B. Research Projects Sanctioned

S No.	Research Project Sanctioned	Name and Designation of the Faculty	Funding Agency	Budgent (Rs. In Lakh)	Month/Year o Sanction
1	Investigation of multi-scale temporal variations and trend in the mass, composition and sources of carbonaceous aerosols in Jammu, an urban location in the foothill region of north-western Himalayas (Major Research Project)	Dr. Shweta Yadav	UGC	15.97	September 2015
2	Cellulase enzyme production from local thermophilic fungi by using agro-industrial residues as substrate (Start-up Grant)	Dr. Anita Singh	UGC	6.00	July,2014

C. Resources Mobilized By the Department From Other Funding Agencies Apart from UGC/ Projects in Pipeline

S No.	Research Project Submitted	Name and Designation of the Faculty	Funding Agency	Budget (Rs. In Lakh)	Month/Year of Sanction
1	Project Proposal Submitted to Department of Science & Technology, GoI Under Scheme FIST -2015 In the Subject Area of Environmental Sciences	H.S. Sehgal G.K. Sehgal Anita Singh Shweta Yadav Dinesh Kumar	DST	280.75	May 2015
The project has been short-listed by the DST for presentation on 8th October, 2015					

2	Spatial Distribution of Uranium and other associated water quality parameter in Eight Districts of Jammu Province	Dr. Pankaj Mehta	BRNS-DAE, GoI	28.47	March 2015

D. Salient Research Findings

- The quality of Potable (Drinking water) of the main campus of Central University of Jammu has been analyzed. Based upon the results, it has been recommended by the Department that RO (Reverse Osmosis) system should be installed

- The Department is not running any research degree programme at present. However, the M.Sc. dissertation work has been done under five broad categories:
    - Air, water and soil quality analysis
    - Remote Sensing and GIS
    - Atmospheric Science/ Meterology
    - Biodiversity
    - Microbial isolation for cellulase enzyme production

- The Drinking water quality of Bagla (Rahya-Suchani) was above the acceptable limit when compared with IS 10500 for the essential parameters analysed indicating that water treatment is mandatory before it is ingested.

- The Ground Water samples collected from Springs (Bowlis) in and around Udhampur District reflected high level of Fluoride and Nitrate in the water samples making it Unfit for direct consumption

- The most weathered samples in the Weathering Profile sampled at Bagla reflected coarse sandy poorly sorted nature of the sediments indicating that winnowing (Aeolian) action is not operational in the region.

- There was an overall increase in the flux of UV radiations from 24th March, 2015 to 26th May, 2015 and the calculated Standard Erythema Dose (SED) (0.71 for UV-A and 0.266 for UV-B) was found to be much lesser than the standards prescribed by the Commission Internationale del'Eclairage (CIE).

- The average concentration of NO2 over the sampling period was found to be 32.29 ± 10.43 µg/m3 , which is much lesser than the permissible National Ambient Air Quality Standards. The average concentration of SO2 over the sampling period (54.16 ± 18.39 µg/m3), remained lesser than the threshold concentrations of SO2 given by NAAQS and WHO.

- The average concentration of fine particulate matter (PM2.5) in the campus area was found to be 39.5 ± 13.4, while in the Temporary Academic Block of the Central University of Jammu, Sainik colony, the average concentration was found to be 44.37 ±18.4, which is above the threshold given by National Ambient Air Quality Standards and World Health Organization, but lesser than the standards given by Central Pollution Control Board.

- During pond water plankton study in Central University of Jammu campus area, total of three groups of zooplankton have been recorded represented by Rotifera, Copepoda and Cladocera.

- A total of 28 fungal species have been isolated from Central University of Jammu campus area and screened for cellulase and laccase enzyme production.

- Twenty four species of tree species (19 medicinal, 7 ornamental, 7 forage and fodder, 7 food, 8 religious) and 22 species of shrub (21 medicinal, 4 religious, 10 ornamental, 9 food and fodder) have been identified.

- Twenty nine insect species belonging to 11 different orders and 25 families have been collected.

- Above ground herb biomass of 4 species (Malavastrum coromandelianum, Trifolium repens, Poa annua, Medicago sativa) have a total biomass of 154.63gm/m2.

- URBAN sprawl and species conservation status were mapped using Geospatial techniques and it was found that species were mostly affected in the region where human intervention is the most.

- Rainfall pattern due to monsoon and western disturbance have significantly altered in course of study time.

- The source of dust episodes in Jammu region has been found to be located at western Iran and Arabian Sea.

E. Research Papers Output of the Faculty for the Last Five Years:

1. Mehta P. (2013) Rock Weathering and Farmland Formation: It's Geology that Determines Biology, Earth Science India, Popular Issue VI (III):1-3

2. Mehta P. and Malviya V.P. (2013) Dynamic Weathering in Western Ghats Southern India– How Does Rock Weathering Proceed in Nature, International Journal of Basic and Applied Sciences, 2 (3): 79-87

3. Mishra A, Tripathi J.K., Mehta P. and Rajamani V (2013) Phosphorus Distribution and Fractionation during Weathering of Amphibolites and Geneisses in Different Climatic Setups of the Kaveri River Catchment, India, Applied Geochemistry, 33: 173-181,

4. Pandey P., Kumar D., Prakash A., Lodhi N., Singh M., Singh S., Jain V. K., Kumar K. (2012). *Temporal Dynamics of Urban Heat Island Formation over Delhi*, International Conference on Urban Climates, 6th-10th August, 2012, UCD, Dublin Ireland, Paper No 500.

5. Sehgal H.S. and Sehgal G.K. (2015). Aquaculture sustainability and environmental aspects of processing and value-addition to carps. *Proc. 102nd Indian Sci. Cong. 3-7 Jan. 2015, Mumbai*: 126-129

6. Shah I.K., and Shah H. (2013). Physico-chemical dynamics in littoral zone of Nageen basin of Dal Lake, Kashmir, India. *International Research Journal of Environmental Sciences,* 2(3): 11-14. ISBN/ISSN no. 2319 – 1414

7. Shah I.K., Pre P, Alappat, B.J (2014) Effect of thermal regeneration of spent activated carbon on volatile organic compound adsorption performances. J Taiwan Inst Chem Eng., 45(4) 1733-1738

8. Shah I.K., Pre P, Alappat, B.J. (2013). Steam regeneration of adsorbents: An Experimental and Technical Review. Chem Sci. Trans., *2(4),1078-88*

9. Sharma A (2013). Air Quality and Physiological response of some Plants.ISBN 978-3-659-14999-3,LAP LAMBERT Academic Publishing Heinrich-Bocking-Str. 6-8, 66121,Saarbrucken,Deutschland,Germany. (Book)

10. Sharma A. and Raina A.K. (2012). Ambient Air Quality of Jammu City: A Study with Reference to SO_2 and NO_2 Contents. International Journal of Environmental Sciences, 3 (1): 650-658

11. Sharma A., and Raina A.K. (2013a). Air pollution in Jammu City. Golden Research Thoughts 3(3) :1-2

12. Sharma A. and Raina A.K. (2013b). Assessment of Suspended Particulate Matter in Jammu City and its Control Strategies .Journal of Environmental Sciences, Toxicology and Food Technology ,7(1): 8-12

13. Singh A., Bajar S., Bishnoi N.R. (2014). Enzymatic hydrolysis of microwave alkali pretreated rice husk for ethanol production by *Saccharomyces cerevisiae, Scheffersomyces stipitis* and their co-culture. Fuel, 116: 699-702

14. Singh A. and Bishnoi N.R. (2013a): Ethanol production from pretreated wheat straw hydrolyzate by *Saccharomyces cerevisiae* via sequential statistical optimization. Industrial Crops and Products, 41: 221-226

15. Singh A., Bishnoi N. R.(2013b): Comparative study of various pretreatment techniques for ethanol production from water hyacinth. Industrial Crops and Products 44: 283-289

16. Singh A., Manju, Yadav A., Bishnoi N. R. (2013a). Statistical screening and optimization of process variables for xylanase production utilizing alkali pretreated rice husk. Annals of Microbiology 63: 353-361

17. Singh A., Shrama P., Saran K. A., Singh N., Bishnoi N.R. (2013b).Comparative study on Ethanol production from pretreated sugarcane bagasse using immobilized *Saccharomyces cerevisiae* on various matrices. Renewable Energy, 50: 488-493

18. Tandon A., Yadav S. and Attri A. K. (2013). Non-linear analysis of short term variations in ambient visibility. *Atmospheric Pollution Research,* 4, doi: 10.5094/APR.2013.020

19. Tandon A., Yadav S., Attri A. K. (2012), Analysis of Annual Cyclic Variations in Total Ozone Column over Indian Region. *Journal of Atmospheric Chemistry*, 69(4), 321-335 (doi: 10.1007/s10874-012-9243-4).

20. Verma A., Shalu, Singh A., Bishnoi N.R., Gupta A. (2013). Biosorption of Cu (II) using free and immobilized biomass of *Penicillium citrinum*. Ecological Engineering, 61: 486-490

21. Yadav S., Tandon A., Attri A. K. (2013). Characterization of Aerosol Associated Non-Polar Organic Compounds using TD-GC-MS: A Four Year Study from Delhi, India. *Journal of Hazardous Materials*, 252-253: 29-44. doi: 10.1016/j.jhazmat.2013.02.024.

22. Yadav S., Tandon A., Attri A. K. (2013). Monthly and seasonal variations in aerosol associated n-alkane profile in relation to meteorological parameters in New Delhi, India. *Aerosol and Air Quality Research*, 13: 287-300. doi: 10.4209/aaqr.2012.01.0004.

Number Of Papers Presented In International And National Conferences Attended by Faculty:

23. Kumar D.*, Mohanty U C, Kumar Krishan, Satellite radiance data assimilation using 3D-var : A case study of Thunderstorm over Indian Region, Committee on Space Research (COSPAR) – Moscow, 2-10 August, 2014, (A2.1-0037-14).

24. Kumar D., Kumar K., Prasad K.S., Mohanty U.C., Manoj, (2013). Impact of satellite radiance on the simulation of thunderstorm, International Humboldt Kolleg on Management of Water, Energy and Bio-resources in Changing Climate Regime: Emerging Issues and Environmental Challenges Programme organised by Jawaharlal Nehru University, New Delhi, p-14.

25. Mehta P. (2014) Food and Agriculture, The Future of Sustainability: International Association of Mathematical Association(IAMG), Geostatistical and Geospatial approaches for Characterization of Natural Resources in the Environment: Challenges, Processes and Strategies, 17-20th October 2014, New Delhi, INDIA (Oral).

26. Mehta P., Singh U.K. (2013): Green Technology & Green Building towards Sustainable Future: International Humboldt Kolleg Feb 8-9 2013, JNU, New Delhi, Management of Water, Energy and Bioresources in Changing Climate Regime: Environmental issues and Challenges.

F. The Strength of the Department in Various Domains of Knowledge in which Research is Being in which the University expect to attain global standards.

The Domains of knowledge in which the Department expects to attain global standards include:

- Environmental Technology
- Aquatic Resource Management

- Atmospheric Sciences
- Rock-Water Interaction.

G. Roadmap for Research in 3/4 Core Areas Envisaged by the Department

Roadmap for research in the core areas envisaged by the Department is outlined below:

a) Development/Strengthening of Laboratory Facilities for carrying out effective research in the identified Domains of Knowledge as given under point 5 above.

b) Validation of Analytical Techniques and QA/QC procedures in the identified research domains.

c) Development of Public-Private-Partnership (PPP) model with National and International organisations working in the identified and related research domains.

d) Formulation of strategies/recommendations for environmental management based on the research output