

Aakanksha Kumari

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Education

Doctor of Philosophy (Ph.D.)

UNIVERSITY OF QUEENSLAND & IIT DELHI ACADEMY OF RESEARCH (UQIDAR)

CGPA (Cumulative Grade Point Average): 10

UQ, Australia & IIT Delhi, India

August 2022 - present

Bachelor's and Master's in Chemistry (Minor in Earth Sciences)

INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH (IISER), MOHALI

CPI (Cumulative Grade Point): 9.6 (top student in 5th, 6th, 9th and 10th semesters)

Mohali, Punjab, India

Aug 2017 - May 2022

Higher Secondary- 12th Grade : Central Board of Secondary Education (CBSE)

ALL INDIA SENIOR SECONDARY CERTIFICATE EXAMINATION (AISSCE)

Percentage: 92.2 % (461/500 marks)

Varanasi, Uttar Pradesh, India

2016

Secondary- 10th Grade : Bihar School Examination Board (BSEB)

SECONDARY SCHOOL EXAMINATION

Percentage: 73 % (365/500 marks)

Rohtas, Bihar, India

2014

List of Publications

Hydroclimatic impacts of '8.2-ka event' in western Indo-Pacific Warm Pool

YAMA DIXIT, STEPHEN CHUA, **AAKANKSHA KUMARI**, YU TING YAN, ADAM D. SWITZER

Nature Communications Earth & Environment (Submission ID: COMMSENV-22-0355A)

under review

Assessing the impacts of Little Ice Age on the Western Himalayas

ANUBHAV SINGH, **AAKANKSHA KUMARI**, BHAVUK SHARMA, RAJALAKSHMI S, DR. YAMA DIXIT

Holocene Sage Journals (Submission ID: HOL-23-0135)

accepted

Molecular signatures of natural organic matter sources & Anthropogenic contamination in a high altitude lake system in Kashmir Himalayas

AAKANKSHA KUMARI, DR. ANOOP AMBILI, DIPTIMAYEE BEHERA, NISHANT

in preparation

Research Experience

Project - Indian summer monsoon variability during the past ten thousand years

ADVISOR: **DR. YAMA DIXIT**, ASSISTANT PROFESSOR, IIT DELHI, AND **DR. WILLIAM DEFLIESE**, ASSISTANT

PROFESSOR, UQ AUSTRALIA

UQ, Australia & IIT Delhi, India

Oct 2022 - present

- Working on reconstructing high-resolution past monsoon changes in the plains of northwest India with more focus on studying lakes located at the margin of Thar Desert in northwest India, including Kotla Dahar Lake, Riwasa Lake, and Karanpura Lake to map out the evolution of Thar Desert
- Techniques to be used** - AMS, XRF, ICP-OES, IR-MS

Project - Variability in Westerlies-driven precipitation in India during the past two millennia

ADVISOR: **DR. YAMA DIXIT**, ASSISTANT PROFESSOR, IIT DELHI

Indian Institute of Technology, Delhi, India

Jan 2023 - Aug 2023

- Analysed the hydroclimate conditions in the Western Himalayas by quantitatively synthesizing and assessing the existing paleoclimate records to develop a better understanding of the regional coherency (or lack thereof), impacts of LIA, and modern-day moisture source dynamics (using back trajectory analysis).
- Softwares used** - HYSPLIT model, REDFIT, ArcGIS/QGIS

STEER Project - Impact of changing rainfall patterns on toll road traffic in India

Indian Institute of
Technology, Delhi, India

ADVISOR: DR. YAMA DIXIT, ASSISTANT PROFESSOR, IIT DELHI AND DR. SANDEEP SUKUMARAN, ASSOCIATE
PROFESSOR, IIT DELHI

Aug 2022 - Nov 2022

- Extracted all existing paleoclimatic data from various archives in India, such as tree rings, speleothems, and lake data.
- Re-scaled and compiled data from different proxies to identify the trend and compared it with the modern-day precipitation data (IMD data)

Research Intern - Spatial variation of the local meteoric water lines across India

Indian Institute of Tropical
Meteorology (IITM) Pune, India

ADVISORS: DR. S. CHAKRABORTY, SCIENTIST F, IITM PUNE

May 2022 - Oct 2022

- Learned about the amount effect and the isotope ratios of precipitation for doing rainfall analysis.
- Plotted LMWL for different parts of India for comparison, statistical analysis of the data.

Thesis - Distribution and occurrence of organic contaminants from freshwater aquatic systems in Kashmir Himalayas

Indian Institute of Science Education
and Research (IISER) Mohali, India

ADVISORS: DR. ANOOP AMBILI, ASSISTANT PROFESSOR, IISER MOHALI

September 2021 - April 2022

- Investigating lake ecosystem and factors influencing them using lipid biomarkers analysis (Organic Geochemistry).
- **Experimental Techniques** - Speed extraction, Column chromatography and Gas chromatography mass spectrometry (GC-MS).

Research Intern - Source Apportionment and Degradation Status of Organic Matter

Indian Institute of Science Education
and Research (IISER) Mohali, India

ADVISORS: DR. ANOOP AMBILI, ASSISTANT PROFESSOR, IISER MOHALI

May 2021 - Aug 2021

- Learned about different indices based on lipid biomarkers and amino acid derivatives for studying paleoclimate.
- **Experimental Techniques** - Speed extraction, Column chromatography, Grain size analysis (using MALVERN Master sizer) and Gas chromatography mass spectrometry (GC-MS).

Research Intern - Literature review on the use of Reformatsky Reaction in the synthesis of Natural products

Indian Institute of Science Education
and Research (IISER) Mohali, India

ADVISORS: DR. S. ARULANANDA BABU, ASSOCIATE PROFESSOR, IISER MOHALI

Jun 2019 - Dec 2020

- Worked on making monograph of the research papers published related to this topic.
- Learned new concepts of Organic Chemistry like stereogenic centers, coupling reactions, optimization methods etc.

Research Intern - Laboratory work in C-H activation and Metal-Mediated Organic Synthesis (CAMMOS) lab

Indian Institute of Science Education
and Research (IISER) Mohali, India

ADVISORS: DR. S. ARULANANDA BABU, ASSOCIATE PROFESSOR, IISER MOHALI

May 2019

- Hands on experience on various techniques- Column chromatography, Nuclear Magnetic Resonance (NMR) sample preparation, Distillation, Rotary evaporator, Thin-layer Chromatography (TLC), Acid-base extraction, Gravity and vacuum filtration, crystallization etc

Research Intern - Planetary Motions

Indian Institute of Science Education
and Research (IISER) Mohali, India

ADVISORS: DR. SANDEEP GOYAL, ASSISTANT PROFESSOR, IISER MOHALI

May 2018 - Jul 2018

- Studied about the precision of Mercury and its relation with the theory of General relativity
- Performed Computational analysis using MATLAB

Computational and Analytical Skills

Analytical skills	GC-MS, ICP-OES, IR & UV-Vis spectrophotometer, NMR, AAS, XRD, XRF, SEM, MALVERN Mastersizer
Softwares	REDFIT, ArcGIS/QGIS, Bacon age-modeling software, Grapher, Mapper, HYSPLIT model, ChemDraw
Languages	Python, MATLAB, SageMath
Other Tools	LaTeX, MS Office

Scholastic Achievements

GRE® General Test

SCORED 314 OUT OF 340

2023

TOEFL iBT® Test

SCORED 99 OUT OF 120

2023

Graduate Aptitude Test in Engineering (GATE)

SECURED AIR 771 (GATE SCORE- 554) IN GATE 2022

2021, 2022

JEE Mains (97.97 percentile) + JEE Advanced (91.32 percentile)

JOINT ADMISSION BOARD (JAB)

2016, 2017

Uttar Pradesh Technical University (UPTU) Qualified

DR. A.P.J. ABDUL KALAM TECHNICAL UNIVERSITY

2016, 2017

Awards and Honors

2020	1st Prize and Academic Excellence Certificate , Indian Institute of Science Education and Research, Mohali	Punjab, India
2019	1st Prize and Academic Excellence Certificate , Indian Institute of Science Education and Research, Mohali	Punjab, India
2016	All India Topper in Chemistry (100/100 marks)) , CBSE 12th Board	Varanasi, India
2016	Merit Certificate by UP Government for top students , CBSE 12th Board	Varanasi, India
2015	Merit Certificate by Banaras Hindu University (BHU) , CBSE Class 11th	Varanasi, India
2014	1st Division in Matric Prize (State Level) , 10th Bihar School Examination Board	Rohtas, India

Scholarships

Prime Minister's Research Fellowship (PMRF)

MINISTRY OF HUMAN RESOURCE DEVELOPMENT, GOVERNMENT OF INDIA

Aug 2023 - present

UQIDAR Scholarship

UQ –IIT DELHI ACADEMY OF RESEARCH

2022-23

Recipient of DST INSPIRE Scholarship

MINISTRY OF SCIENCE AND TECHNOLOGY, GOVERNMENT OF INDIA

2017-22

UP Kanya Vidya Dhan Yojana Fellowship

UTTAR PRADESH (UP) GOVERNMENT

2016

Bihar Board Matric 1st Division Scholarship

GOVERNMENT OF BIHAR

2014

Seminars and Science Outreach

Exhibitor - Abu Dhabi International Petroleum Exhibition and Conference (ADIPEC) 2023

Abu Dhabi National Oil Company
(ADNOC), UAE

EXHIBITION ON BEHALF OF INDIAN INSTITUTE OF TECHNOLOGY DELHI

02-05 Oct 2023

- Created a Paleoclimate Time Machine game and a 4.2 Ka event coding activity to introduce the paleoclimate field to younger generations.

Presentation (delivered) - Indian summer monsoon variability during the past ten thousand years

Inter-University Accelerator Centre
(IUAC), Delhi

AUC- 74TH USERS' WORKSHOP: USERS' PRESENTATIONS FOR BEAM TIME PROPOSAL

04 July 2023

- Defended my proposal of dating lake sediment samples using AMS for establishing a robust chronology which will be helpful in reconstructing high-resolution past monsoon changes for studying lakes located at the margin of Thar Desert.

Poster Presentation (delivered) - Holocene hydro-climatic variability in South Asia: Lessons from the past proxy records

The Geological Society, London

ASIAN CLIMATES, BIODIVERSITY, AND TECTONICS HYBRID CONFERENCE

06 September 2022

- Gave an overview of lake records from northern India and their contribution to the overall understanding of the Holocene Indian summer monsoon variability on the subcontinent.

Theis Research Presentation (delivered) - Distribution and Occurrence of Organic Matter in freshwater aquatic systems from Kashmir valley, Northern Himalayas

IISER Mohali, India

DEPARTMENT OF CHEMICAL SCIENCES - IISER MOHALI

15th April, 2022

- Introduced my thesis work of identification of natural sources of sedimentary organic matter(SOM) and analysis of the factors that influence the lake dynamics.

Presentation (delivered) - Effects of 21st century wars on the Earth's Atmosphere

IISER Mohali, India

DEPARTMENT OF CHEMICAL SCIENCES - IISER MOHALI

6th April, 2021

- Introduced the concept of **Nuclear Winter theory** and its mechanism, consequences etc.
- Supported the theory by referring to various analogs, historical results and modelling results.

Presentation (delivered) - Oxygen and hydrogen isotope ratios in tree rings/Ice cores

IISER Mohali, India

DEPARTMENT OF CHEMICAL SCIENCES - IISER MOHALI

25th March, 2021

- Briefly introduced the field of **Paleoclimatology**.
- Talked about isotope ratios of oxygen and hydrogen and its correlation with temperature with more emphasis on proxies namely, tree rings and ice cores.

Presentation (delivered) - Detergent of the Atmosphere

IISER Mohali, India

DEPARTMENT OF CHEMICAL SCIENCES - IISER MOHALI

3rd Oct, 2020

- Talked about the role of **hydroxy radicals** in the atmosphere, global OH distribution and its variability.

Scientific talks (attended) - 1st CRIKC Chemistry Symposium (CCS2019)

IISER Mohali, India

DEPARTMENT OF CHEMICAL SCIENCES - IISER MOHALI

2nd and 3rd Nov, 2019

- Talk on **metal-organic frameworks** by Dr. Rajesh Das(Phd scholar, IIT Ropar).
- Talk on "Design of porous metal-organic frameworks (MOFs) for selective capture and utilization of CO₂" by Dr. C. M. Nagaraja.

Seminar (attended) - Evaluation of black carbon aerosols measurements in the Arctic

IISER Mohali, India

P. R. SINHA TIFR BALLOON FACILITY, HYDERABAD

19th Nov, 2018

- Explained laboratory and field experiments to assess the accuracy of **Black Carbon (BC) aerosol** measurement in the Arctic

Science Workshop Training

Punjab University, Chandigarh

ADVISORS: **DR. ANANTH VENKATESAN**, INSPIRE FACULTY, IISER MOHALI

Aug 2018 - Nov 2018

- Workshop training in various fields including machine shop, woodwork, welding, glass blowing etc.
- Equipped with basic workshop training & built things and fabricated equipments required for the general research projects.

Scientific talks and workshop (attended)

IISER Mohali, India

ROYAL SOCIETY OF CHEMISTRY ROADSHOWS 2017 - IISER MOHALI

14th Nov, 2017

- Learned writing manuscript / poster for maximum impact.
- Talk on the topic "**Nature's Medicine Chest**: Opportunities for Synthesis and Drug Discovery" by Prof Margaret Brimble.

Field Work Experience

Lake sediment sampling from Paleolake Rewasa

Sikar, Rajasthan, India

ADVISORS: **DR. YAMA DIXIT**, IIT DELHI & **DR. WILLIAM DEFLIESE**, THE UNIVERSITY OF QUEENSLAND

December 2023

Field Survey to paleolake Riwasa

Haryana, India

ADVISORS: **DR. YAMA DIXIT**, IIT DELHI & **DR. WILLIAM DEFLIESE**, THE UNIVERSITY OF QUEENSLAND

November 2023

Karanpura Paleolake sediment sampling

ADVISORS: **DR. YAMA DIXIT**, IIT DELHI & **DR. V. N. PRABHAKAR**, IIT GANDHINAGAR

Hanumangarh, Rajasthan

May 2023

Dry Lake sediment sampling from Paleolake Kotla Dahar

ADVISORS: **DR. YAMA DIXIT**, IIT DELHI & **PROF. JONATHAN HOLMES**, UNIVERSITY COLLEGE LONDON

Nuh, Haryana, India

April 2023

Extra-Curricular Activities

2022 **Mentorship provided to two winter project interns,**

IIT Delhi, India

2019 **MIMAMSA Science Quiz,**

IISER Pune, India

2018-19 **Member of Organizing Committee,**

IISER Mohali, India

2018 **Core Member of Foundation Day,**

IISER Mohali, India

2016 **Vigyan Gyan Vision Science Quiz, DST,**

CHS, India

Hobbies, include art & craft, drawing, painting (poster colour) etc.