



*Placement Brochure*  
*Department of Chemistry*  
*University of Kashmir*

# The Career Overture

EMBARCKING ON THE PROFESSIONAL PRELUDE

**Department of Chemistry**  
**School of Physical and Mathematical Sciences**



**Photo.** Students of the Department.

## About Department of Chemistry

### Head's Desk-Message

As Head of the Department, it is my privilege to lead a team of esteemed faculty, dedicated staff, and talented students who share a common passion for quality education, scientific innovation and societal outreach. Chemistry plays a vital role in our understanding of the world and offers limitless possibilities for scientific exploration, innovation, and positive societal impact. As we embark on this path together, I want to convey our shared vision and commitment to excellence. I want to express my deepest appreciation to our dedicated faculty members, whose expertise and passion for teaching and research form the backbone of our department. Despite limited resources, your unwavering commitment to nurturing our students' intellectual growth and pushing the boundaries of scientific knowledge is truly commendable. I encourage you to continue fostering a vibrant and inclusive academic environment that sparks curiosity and empowers our students to become critical thinkers and problem solvers. To our students, I extend my warmest welcome. You are at the heart of our department, and we are here to support your academic and personal growth. Embrace the challenges and opportunities that lie ahead, and remember that your journey in chemistry is not limited to the confines of the classroom. Engage with your peers, collaborate with faculty members, and take advantage of the whatever resources available to you. Through your dedication and hard work, you will develop the skills and knowledge needed to achieve the vision of the department. Our department's commitment to excellence extends beyond education, as we strive to be at the forefront of innovative research. Together, we will push the boundaries of knowledge, exploring new frontiers and addressing pressing global challenges from this part of the country. Let us embrace interdisciplinary collaborations, forging partnerships with other departments and institutions, as we recognize that groundbreaking discoveries often emerge at the intersections of disciplines. Through our research, we aim to make a visible difference in the areas such as sustainable chemistry, materials science, drug discovery, etc. As ambassadors of chemistry, we also have a responsibility to engage with the broader community. Let us reach out to schools, community organizations, and the public to promote scientific literacy, inspire young minds, and demonstrate the relevance of chemistry in everyday life. By fostering public understanding and appreciation for our discipline, we can forge stronger connections and create a positive impact that extends far beyond the walls of our department.



In conclusion, I am pleased and honored to lead the Department of Chemistry on this journey of discovery, learning, and innovation. Together, let us uphold the highest standards of scientific excellence, integrity, and professionalism. Let us foster a supportive and inclusive community that values diversity and respects the varying perspectives. By working together, we can fulfill our mission of advancing knowledge, educating future leaders, and using chemistry to improve our world.

**Prof. Aijaz Ahmad Dar**  
**Head of the Department**

## Overview of the Department

The Department of Chemistry is one of the oldest departments of The University of Kashmir, Hazratbal, established in 1969 with the sanctioned strength of 14 teaching posts (2 professors, 6 Associate professors and 6 Assistant Professors). The Department offers P.G. programme in Chemistry comprising of four semesters through Choice Based Credit System (CBCS) with the current intake capacity of 72 having core, discipline centric and interdisciplinary courses. The department strives to provide high-quality education and training in chemistry to its students with the mission of developing their critical thinking, problem-solving, and laboratory skills, preparing them for successful careers in academia, industry, or other related fields. This programme serves as a launching pad in generating quality human resource for teaching at 10+2, College and University levels and for doctoral & post-doctoral studies in frontier areas of science in both national and international Labs. The department is seriously involved in conducting impactful research in various thrust areas of chemical science including natural product chemistry, synthetic chemistry, soft matter, electrochemistry, material chemistry, bioinorganic/biophysical chemistry, and crystal engineering. The students have access to a departmental library where a large collection of international and national reputed text/reference books are housed. Besides this, the department has a high-end instrumentation facility like SECM, Rheometer, Electrochemical workstation, TGA, HPLC, Fluorimeter, LC-MS, IR, UV-Visible spectrometers, stopped flow kinetic systems, Fluorescence microscope, Tensiometer etc. and laboratory infrastructure for conducting quality research. The department was awarded DST-FIST program in years 2003, 2011 and 2021 to the tune of 3.8 crore. The SAP-UGC (DRS-I) was awarded in 2016 with an amount of 1.22 Crore. The department is the part of DST-PURSE and MHRD-RUSA programs awarded to the University of Kashmir with the share of about 3 crores. The department of chemistry regularly organizes various workshops, symposia, and national/international conferences on thrust areas of chemical sciences. A large number of postgraduate students qualify NET and GATE examinations every year. During the last 10 years, the department has produced 52 Ph.Ds, published 450 research papers in Scopus indexed journals, and generated about 5 crores through core grants and 1.5 crore as mentorship projects including WOS-A, NPDF, CSIR-RA, and UGC-Kothari funded by DST, SERB, UGC and CSIR during 2011-2020.

### **Vision Statement**

We envision to develop our department as centre of excellence in chemical education, foster innovations in research, address societal challenges, inspire and empower students to become lifelong learners and leaders in the field of chemistry, and to promote sustainability for growth of ecologically conscious future.

### **Mission Statement**

Our mission is to provide high quality teaching environment to our students, conduct innovative research, foster scientific excellence, promote ethical conduct, engage in knowledge transfer and outreach, and contribute to societal and environmental well-being through the application of chemistry.

## Alumni



Prof. Mushtaq A. Siddiqui, Vice Chancellor, Islamic University of Science and Technology, Kashmir.

Prof. Hari K. Bhat, Professor School of Pharmacy, University of Missouri, Kansas City, US



Dr. Mohd. Ayub Qadri, Scientist, National Institute of Immunology, New Delhi, India

Dr Surinder K. Koul, Retired Deputy Director, IIIM, Jammu



Prof. Dr. Rajiv Kumar, Senior Scientist, German Cancer research Center, University of Heidelberg, Germany

Dr. Saleem Kamili, Chief, Division of Viral Hepatitis, US Centers for Disease Control and Prevention, Atlanta, USA.



Prof. Pushpati Razdan, Ex-Vice Chancellor, D. Y. Patil University Pune

Mir Rauf-ul-Hassan, Retired IGP Armed, J&K Police.



Prof. M. A. Qureshi, Ex-Dean Academics, Islamic University of Science and Technology, Kashmir

## Why recruit us?

### 1. Foundations in Chemistry

The chemistry as a subject in our department is divided into several widely recognized subfields and it is mandatory for all the students to take courses in inorganic chemistry, organic chemistry, and physical chemistry, in addition to which advanced courses in the area of material synthesis, characterization and applications are taught as discipline centric courses. We make sure that a chemistry major should be knowledgeable about the important theories, experimental evidence, and applications of these subfields and on the completion of the master programme, a student should be able to apply knowledge from a combination of subfields to solve problems of a chemical nature.

### 2. Laboratory and Project Skills

Chemistry is a laboratory science. So we at the department ensure that all of our chemistry students should acquire the skills necessary to work in an academic, commercial, or industrial laboratory after graduation. These skills include experience with the instruments, glassware, synthetic methodologies, and techniques commonly used in laboratory settings. At the end of the masters programme, students are able to work collaboratively on problems / projects / investigations, and they develop an ability to design experiments from the ground up.

### 3. Analytical Skills

We in the department emphasize that all chemistry majors should be able to draw appropriate and reasonable conclusions from the data/results they collect in the laboratory. Students learn how to assess the uncertainty, precision, and significance of data using formal statistical techniques; as they are comfortable in using commercial software's designed for data manipulation and presentation; and they become familiar with sophisticated chemical computation softwares. Student are given independent problems during project course during which they inculcate problem solving temperament.

### 4. Communication Skills

A successful chemistry graduate has to be communicating in a variety of formats commonly used by chemists. The department has identified certain key areas in this prospect viz; the literature summary, the formal laboratory report, the research poster, the research proposal, and the dissertation/research followed by a seminar presentation. These practices train a student to gather, consolidate and communicate the information, in a more comprehensive way. Therefore, our students have the capability to collect new information, compare it with existing knowledge, make new conclusions out of it and communicate it to the broader audience in both written and oral form.

### 5. Research Tools

Research is the method by which scientific knowledge is acquired, and all chemistry majors should be capable of conducting an independent research project. At Chemistry department emphasis is made on that our taught know how to search reference sources and literature databases for specific information. They should have experience reading the primary scientific literature, develop a hypothesis regarding a significant chemical question, design a method to test that hypothesis, carry out the method they propose, and evaluate the results.

***We are proud of the many outstanding achievements of our students -these highlight the excellent quality of our teaching and research.!***

## Scope

### Health:

The world faces major challenges that demand a response from chemistry. Partnerships are needed between countries, disciplines – including social sciences – and the public and private sectors. There are a number of areas where there is likely to be an increased demand for chemistry. Advances in personalized medicine, mutational drugs, sequencing, vaccines to deal with global health issues and treatments linked to an ageing population are important developments where chemistry will play a role. The health sector provides a wide choice of chemistry careers.

Some of areas in health sector wherein a chemist finds its scope are as under:

- Chemist as a drug designer (Scientist).
- Chemistry graduate as a synthetic chemist in a pharmaceutical company.
- Chemist as lab analyst: one who identifies toxic substances and evaluates potential harmful effects in water, air & soil. Conducts laboratory and field experiments
- Chemist as a quality control for drugs: drug inspection
- Chemist as a food inspector.

### Research:

Chemistry graduates progress into a number of programmes from BSC through to master's and PhD level. These degrees provide advanced research and writing options with a range of jobs such as:

- Research scientist / associate : Designs and conducts research experiments
  - Analyses the data and results (Toxicologist, chemical consultant)
  - Publishes journal papers, files patents, and presents information at conferences
  - Produces research reports and advises business, government and industry
- Environmental scientist / technician
  - Applies knowledge of atmospheric, water and soil chemistry to the environment
  - Carries out field and lab tests and records data eg, measures level of pollutants
  - Conducts analysis and writes technical reports
  - Develops and oversees policy and procedures
  - Interprets regulations and monitors compliance
- Field / laboratory technician
  - Plans and carries out research experiments with guidance
  - Maintains and calibrates equipment
  - Liaises with scientists and industry personnel
- Laboratory manager
  - Collects and collates data
  - Manages laboratory staff, budgets, workloads
  - Maintains and updates lab documentation
  - Ensures safety and quality standards
  - Reviews methods and validates results
- Secondary school teacher
  - Plans and delivers instructional lessons
  - Evaluates performance and provides feedback
  - Sets and marks assignments and tests
- Science communicator
  - Presents science topics to various audiences eg, publicising research findings

## Organizational:

Many types of organisations employ Chemistry graduates. They include:

- Government departments and agencies
- Crown Research Institutes (IITs)
- Other research organizations and laboratories (CSIR, IISER, NIT)
- Manufacturing firms
  - Industrial plants
- Environmental consultancies
- Pharmaceutical companies
- Food and drink producers
- Research and development organizations
- Energy companies
- Secondary schools and universities (teachers, lecturers, Professors)

## Roles we play (HR analyst, sportswriter, content writer, microbiologist)

- Manage educational programmes eg, exhibitions, outreach events, seminars
- Produces content eg, media releases, videos, Patent attorney
- Researches technical or scientific documents, to assess if a product is new and innovative
- Maintains knowledge of laws and regulations
- Writes patent applications for new chemical inventions, including medicines and materials (Patent officer)
- Ensures that products, processes and systems meet quality standards
- Develops policies and procedures (Scientific Advisor).
- Solves problems, makes decisions and supports others to achieve these standards Data analyst / technician
- Analyses data and models techniques to solve problems
- Uses software and computer programs, may develop these for new products
- Entrepreneur & self-employment Entrepreneurship and innovation are an increasing part of the working landscape. Through generating a business idea, or getting involved in a startup/business venture, students have the potential to create a work opportunity that aligns with their knowledge, skills, values and risk profile. To get started on how to establish, run and grow a new business (Pharmaceutical & Chemical suppliers).

Expanding industries include:

- New sources of energy
- Development of forestry and dairy resources
- Materials, pharmaceuticals and biotechnology
- Tech sector including nanotechnology, app development and data science

## Comprehensive List of academic programmes offered by the department

<b>Course Code</b>	<b>Duration of course</b>	<b>Brief Description</b>
Masters in Chemistry (96 Credit course)	2 Years	73 student batch is selected every year for the Masters in Chemistry through a University entrance test.
Integrated Ph. D. Programme.	3+2 years	Eligible students (NET/SET/GATE/University entrance test, etc.) are selected by Departmental Research Committee. About 30-40 scholars are enrolled for the programme.



## Faculty Expertise



**Faculty Photograph.** From left to right: Dr. Masood A Rizvi, Prof. Mohsin A. Bhat, Prof. Aijaz Ahmad Dar, Prof Syed Wajaht Amin Shah and Dr. Dar, Aijaz Ahmad (In)

### **1. Prof. Syed Wajaht Amin Shah (Professor)**

**Ph. D. Title:** Phytochemical Studies on Alpine , medicinal and aromatic plants; conversion of their principle Constituents into pharmacodynamic compounds.

**Supervisor:** Prof. M.A Qureshi, **Co-supervisor:** K.L Dhar

**Institute:** University of Kashmir, Regional research laboratory (CSIR-RRL, Jammu)

#### **Research interests:**

Chemistry of natural products (bioactive guided isolation and characterization of active principles from medicinal plants). Medicinal chemistry (design and Synthesis of biologically active antimicrobial, antioxidant, antihelminthic and Anticancer molecules). Design and Synthesis of semi-synthetic analogues.

#### **Teaching:**

Natural product chemistry, Organic spectroscopy, Reaction mechanism

### **2. Prof. Aijaz Ahmad Dar (Professor)**

**Ph.D. Title:** *Studies on Surfactant-Surfactant and Surfactant-Polymer Interactions*

**Supervisor:** Dr Akhil Ranjan Das, Polymer science unit, IACS, Kolkata

**Institute:** Indian Association for the Cultivation of Science, Jadavpur, Kolkata-32, India

#### **Research Interests:**

Development of stimuli responsive Natural product based hydrogels and metallohydrogels for their prospective applications in Health and Environment; Development of photoluminescent materials based on multi-level Forster Resonance Energy Transfer in soft system based self-assemblies for their prospective light harvesting applications; understanding shape transitions of self-assemblies of surfactants by understanding changes in the concentrations of various ions, water and neutral molecules at micelle-water interface and the protein topology at the membrane-water interface using Novel chemical trapping method; and utilizing the novel Chemical Kinetic Method to probe the distribution of antioxidants within the interface of micelle-water/emulsion-water systems.

#### **Teaching:**

Quantum Mechanics, Numerical methods, solid state chemistry and softmatter

### 3. Prof. Mohsin Ahmad Bhat (Professor)

**Ph.D. Title:** *Electrochemical Investigations in Imidazolium based Ionic Liquids.*

**Supervisor:** Dr Santosh K. Haram, Department of Chemistry, Savitribai Phule Pune University.

**Institute:** Savitribai Phule Pune University, Ganeshkhind, Pune-411007, India.

#### Research Interests:

Presently I along with my research group are working on the design and development of novel strategies, electrode and electrolyte systems for fuel cell, bulk scale electro/photoelectron-synthesis and electrochemical sensing applications. For the electrocatalytic materials we are currently working on the design and functionalization of graphene and metal organic framework (MOF) based materials for electrocatalytic materials. In our efforts for the design of electrocatalytic electrolytes we have been working on the design and use of room temperature ionic liquids and surface active ionic liquids (SAILs) for electrochemical investigations and applications. A new addition to our research interests is our desire to make use of electrochemistry for diagnostic and sensing applications wherein we wish to make use of electrochemical methods for detection and quantification of both redox active as well as redox inactive biomolecules (ENZYMES, DNA, Antibodies), Viruses and besides following the metabolic state of living cells.

The main focus of our research work is the use of electrochemistry, functional nanomaterials and Ionic Liquids to address the various Energy, Environment, Health and Material Production related challenges critical for our well-being and future generations. In this regard our group is currently working and plans to work for; **ENERGY, ENVIRONMENT, HEALTH, and UNCONVENTIONAL SOLVENTS.**

#### Teaching:

Electrochemistry, Chemical Kinetics, Statistical Thermodynamics and Irreversible Thermodynamics

### 4. Dr. Masood Ahmad Rizvi (Associate Professor)

**Ph.D. Topic:** Synthesis, Bioactivity and Coordination Inspired electrochemical behaviour of Organic/Metal Organic Systems

**Supervisor:** Professor. G.M. Peerzada, Prof. Department of Chemistry, University of Kashmir

**Institute:** University of Kashmir

#### Research Interests:

Coordination compounds as photo redox catalysts for novel organic transformations. 2. Ligand modulated potentials for emerging pollutant attenuation and repair of oxidative stress. 3. Chemico biological interaction of supra decorated systems for bio target modulation. 4. Coordination compounds as smart dopants for Hybrid Materials for environmental sustainability. 5. Coordination inspired redox behavior and its utilization in designing novel analytical systems.

#### Teaching:

Inorganic Chemistry, Chemistry of organometallic compounds, Environment Chemistry.

### 5. Dr. Aijaz Ahmad Dar (In) (Assistant Professor)

**Ph.D. Title:** Rational Design and Synthesis of Molecular and Extended Zinc Phosphates: Insights into Mechanism of their Formation.

**Supervisor:** Ramaswamy Murugavel

**Institute:** Indian Institute of Technology-Bombay

#### Research Interests:

I have worked on the synthesis, characterization and applications of inorganic-organic hybrid materials, like coordination clusters and frameworks during my Ph. D. At University of Kashmir our broader focus

development of advanced functional materials using Crystal Engineering principles and involving organic precursors. Co-crystal development is the major thrust area and currently we are actively involved in the following areas: i) Understanding the role of intermolecular interactions on crystal growth. The understanding is one of the basic objectives of crystal engineering and of immense significance for design of new materials with desired properties. ii) Development of multi-stimuli responsive functional materials. Stimuli-responsive behavior of a material is an intelligent attribute which can be exploited for their potential applications as sensors and devices. We have designed a range of solid-state thermochromic, vapochromic and mechanochromic sensing materials with potential end-user applications. iii) Development of solid state organic luminescent materials. Solid-state emission also called as Aggregation Induced Emission is a rare attribute of materials and we focus on design and tuning of organic solid-state emissive materials with scope of practical applications. iv) Development of pharmaceutical cocrystals. This is an important area of focus, in which we target cocrystallization of commercial drugs (Class II) with solubility and stability limitations with GRAS cofomers for development of new drugs with better efficiency.

#### **Teaching:**

Molecular Symmetry, Inorganic Chemistry, Supramolecular chemistry, Spectroscopy.

### **Highlight the expertise and achievements of faculty members within the department/faculty**

#### **Prof. Syed Wajaht Amin Shah**

1. Successfully completed guidance of 8 M. Phil and 12 Ph. D. candidates.
2. Published over 74 research articles in the reputed national and international journals.
3. Leading two ongoing research projects funded by prestigious organizations such as SERB-DST, New Delhi and JK-DST on the discovery and evaluation of bioactive compounds for therapeutic applications. Phytochemistry, Anti-proliferative and Radical Scavenging Activity of *Piceas smithiana* (Wall) Boiss oil.
4. Presented at Harvard, MA, USA, in October 2012 at a conference organized by the International Chemical Biology Society (ICBS).
5. Drug discovery from natural products and traditional medicines: Lecture delivered in N Chandigarh in November 2014. Highlighted the importance of natural products and traditional medicines in drug discovery processes, emphasizing their potential as sources of novel therapeutics.
6. Immunomodulatory potential of isolated constituents from *Salix Caprea*: Presented at the Drug Discovery and Therapy World Congress 2015 in Harvard, MA, USA.
7. GC-MS analysis and Antioxidant activity of Essential oil of *Artemisia amygdalina*: Lecture given at the World Congress on Genetics and Genomics and personalized medicine in IISc Bengaluru, India, in November 2017.

#### **Prof. Aijaz Ahmad Dar**

8. Qualified NET only in June 2000 and then twice for Junior Research Fellowship (JRF) conducted by CSIR, India in December **2000** and June **2001**. Ranked among the top 20% of the students who had qualified CSIR-JRF NET in year 2001.
9. Teacher Summer Research Fellowship for the period of two months from November to December, 2011 by IASc-INSA-NASI, India for working in IIT Bombay, Mumbai on Ultrafast spectroscopic processes.
10. Raman Postdoctoral Fellowship for Indian Scholars to USA (2013-2014) by UGC, New Delhi for working at Rutgers-The State University of New Jersey, USA for the period of eight months due in 2013-2014. (Postdoc from 26-September, 2013 to 31st May, 2014)
11. Postdoctoral Fellowship by Prof. Larry Romsted at Department of Chemistry and Chemical Biology, Rutgers-The State University of New Jersey, USA for the period of one year from 21st Nov. 2016 to 20th Nov. 2017
12. Head of the Department of Chemistry, University of Kashmir from 1<sup>st</sup> June, 2023.
13. Member of the Board of Professional Entrance Examination- J&K.

14. Inorganic and Physical Chemistry Project Advisory Committee (IPC-PAC) co-opted member, SERB, INDIA., from 2021.
15. Preliminary screening committee member for POWER GRANT, SERB, INDIA from 2023.
16. Editorial Board member of Colloid and Surfaces A Journal published by Elsevier Publishing house.
17. Member of the Screening Committee for promotion of Faculty/Direct recruitments of the University of Kashmir.
18. Published about 110 research articles and two book chapters having citations of above 3000 and h-index of 30.
19. Completed two research projects under CRG, DST-SERB and RUSA, MHRD, and mentoring of WOS-A, NPDF, DS-Kothari fellows with total amount of 2.00 Cr.
20. Eleven (11) Ph.D students completed the degree under my supervision and mentored one NPDF, one Kothari Fellow and one WOS-A scientists.
21. Worked as FIST coordinator and Dy. Coordinator for SAP program of the Department.
22. Academic counsellor and Nodal Officer of Departmental internal Quality Assurance unit of Department of Chemistry, University of Kashmir from 2004-2023.

#### **Prof. Mohsin A. Bhat.**

23. Qualified NET-Junior Research Fellowship (JRF) conducted by CSIR, India in June **2001**. Ranked among the top 20% of the students who had qualified CSIR-JRF NET in year 2001.
24. Raman Postdoctoral Fellowship for Indian Scholars to USA (2014-2015) by UGC, New Delhi for one year Post-Doctoral Fellowship under supervision of Professor Alen J. Bard, at University of Texas at Austin, Austin, USA.
25. Published about 75 research articles having citations of above 886 and h-index of 19.
26. Completed three research projects under CRG, DST-SERB and DST nanoscience, India with totaling 1.86 Cr.
27. Five (5) Ph.D students completed the degree under my supervision and mentored one NPDF and one ICMR Research Associate.
28. **Prof. Mohsin Ahmad Bhat** has been recognized as *Life member of Indian Society* for Electroanalytical Chemistry (ISEAC).
29. **Prof. Mohsin Ahmad Bhat** has been awarded *Teacher Summer Research Fellowship* for year **2013** by IASc-INSANA-NASI, India for working in BARC, Mumbai on DFT studies in Room Temperature Ionic Liquids.

#### **Dr. Masood Ahmad Rizvi**

30. Excellent grade in the teaching learning process from DIQA based on student evaluation.
31. More than 70 research articles in good impact factor journals across major publishing houses (American Chemical society, Royal Society in Chemistry, Elsevier and Wiley Publications)
32. Currently 6 PhD scholars under supervision
33. Total citations of 1300 plus under h index of 20 and i10 of 43.
34. Conducted internship of more than 10 students from various institutions and summer research fellows of Indian Academies of Science.
35. Generated the research funding to the tune of 30 lakh from SERB under the SURE project proposal in year 2023.

#### **Dr. Dar, Aijaz Ahmad (In)**

36. Qualified NET-JRF (2009) and secured a Ph. D. position at the Department of Chemistry, IIT Bombay
37. Worked as Research Associate at The Department of Chemistry, IIT Bombay (2015)
38. Awarded *INSA Visiting Summer Research Fellowship* for three months at IISc, Bangalore in 2018-19. Host. Prof. G. R. Desiraju
39. Awarded *Early career research Award*, by DST-SERB, New Delhi (2017-2020)
40. Awarded *INSA Visiting Scientist Fellow* 2021-22. Host. Prof. C. M. Reddy, IISER Kolkata
41. Recognized *Emerging Investigator-Crystal Growth & Design (ACS)- twice* 2020 and 2022.
42. Recognized as an *Outstanding Reviewer-CrystEngComm (RSC)-2021*
43. Recognized as an *Emerging Investigator-Journal of Physical Chemistry C (ACS)-2023*

44. Recognized as a **New Talent-Crystal Engineering & Communications (RSC)-2023**

45. Selected as a **Member, Indian National Young Academy of Sciences (INYAS), New Delhi (2024-2029)**

46. Awarded 8 research projects (4 as PI, 2 as Co-PI and 2 as Mentor) amounting to approximately 1.80 Crore, by UGC, New Delhi, SERB-DST, New Delhi and JK-DST, Srinagar.

47. 30 research articles, total citations >450, h-index 15.

## Research and Innovation

### Details of ongoing research projects

S.No	Name of the PI/ Co-PI/Name of the person holding the Chair	Title of the research project, endowments, Research Chairs	Name of the funding agency	Duration	Year of award or sanction	Amount in INR.
1	Prof. Syed Wajaht Amin Shah, Prof. Altaf HussainPandith Prof. Aijaz Ahmad Dar, Prof. Mohsin Ahmad Bhat, Dr. Masood Ahmad Rizvi, Dr. Dar Aijaz Ahmad(In)	Proposal under FIST Program-2020 [TPN-52826#]	DST-GOI	5 Years	2021	165 lakhs
2	Prof. Syed Wajaht Amin Shah, Prof. Aijaz Ahmad Dar, Prof. Mohsin Ahmad Bhat	Designing novel materials and novel approaches for the abatement of water containments.	DST-PURSE	4 Years	2022	9 lakhs
3	Prof. G. M. Peerzada Prof. G. M. Rather Prof. M. A. Khuroo Prof. Syed Wajaht Amin Shah, Prof. Altaf HussainPandith Prof. Aijaz Ahmad Dar, Prof. Mohsin Ahmad Bhat, Dr. Masood Ahmad Rizvi, Dr. Dar, Aijaz Ahmad (In)	DRS-SAP	UGC	5 Years	2016	122 lakhs
4	Prof. Syed Wajaht Amin Shah	1. Naturally isolated Valerenic acid as a bioactive scaffold for the generation of chemically diverse analogues of therapeutic importance.	SERB DST	3 Years	2022	37.84 lakhs
		2.Green and Sustainable Synthesis of Tacrine-PyrazoleHybrid(Tacirpyrazoles) Derivatives,Evaluation of their Potential as Selective Inhibitors of Acetylcholineesterase(AChE) and SAR studies.	JKSTIC	2 Years	2024	12 lakhs
5	Prof. Aijaz Ahmad Dar	1. Novel Chemical Imaging Method based on Chemical Trapping for determining topology of proteins in the interfacial region of the membrane mimetic systems.	DST-SERB	3 years	2020	32.26 lakhs
		2. Development of Interfacial engineering guided food processing technology for enhanced shelf life and nutritive value of the food emulsions” sanction under RUSA in the year 2020 to the tune of 94 lakhs.	RUSA	3 years	2021	94 lakhs

6	Prof. Mohsin Ahmad Bhat	1. Surface Interrogation Scanning Electrochemical Microscopy (SI-SECM) Screening of Metal nanoparticle Coupled Semiconductor nanocomposites for Photo-Oxidation/reduction of Water and CO <sub>2</sub> .	DST/ Nanomi ssion	3 years	2019	87 lakhs
		2. Design and Screening of Pdbimetallic alloy (Pd-M) and Pdbimetallicphosphide (Pd-MP) loaded Covalently linked 3-Dimensional graphene/heteroatom doped/co-doped graphene Network (Pd-M-3DHADG and Pd-M-P-3DHADG) nanoelectrocatalysts for Direct Oxidation Fuel Cells	DST- SERB	3 Years	2020	42 lakhs
		3. Designing Metal-Organic Framework/SAIL based Catalytic Green electrolyte Interfaces for doubly sustainable electrochemical CO <sub>2</sub> fixation for the synthesis of value-added Products	DST- SERB	3 Years	2023	47.4 lakhs
		4. Design and development of Chemically functionalized MOF based Electrode Materials for Point of care Electrochemical sensing and estimation Devices for Food Fortifications	JKSTIC	2 years	2024	10.4 Lakhs
7	Dr. Masood Ahmad Rizvi	1. Designing spradecorated allosteric ligands: an attempt in biotarget modulation for pharmacological action.	SERB SURE	3 years	2023	29.97 lakhs
8	Dr. Dar Aijaz Ahmad (In)	1. Co-crystal or Molecular Salt! Can the Dividing Line between Two Conjugate Supramolecular Building Entities be Drawn?	UGC- FRPS Seed Grant Project	2 years	2017	10.00 Lakhs
		2. Crystal Engineering of Pharmaceuticals: Approach to Address the Solubility Limitation of Drugs.	SERB- DST	3 years	2017	31.02 Lakhs
		3. Crystal Engineering approach for the development of Multi-Stimuli responsive luminescent crystalline organic materials	SERB- DST	3 years	2022	37.07 lakhs
		4. Determination of Nucleation and growth kinetics of co-crystals in solution: co-crystallization (Co PI)	SERB- DST	3 years	2022	38.25 lakhs
		5. Crystal Engineering approach to improve bioavailability via solubility and stability of nutraceuticals	JKSTIC	2 Years	2024	12 lakhs

## Important publications, and innovations emerging from the department/faculty

- Shariqah Hijazi, A. Shafi Ganie, Mohammed M. Rahman, And **Wajaht A. Shash**. Facile Synthesis of Surface Functionalized Fluorescent Carbon Quantum-Dots For Selective Detection Of Ferric Ions Environmental Science: Nano, **2023**, [https:// Doi: 10.1039/D3EN00376K](https://doi.org/10.1039/D3EN00376K). [Impact Factor: 7.3]
- Parvaiz A. Dar, Naseer A. Dar, Enaitullah Rather, **Wajaht A. Shah**, Synthesis, Optical Studies And DFT Analysis Of Benzo[B][1,4]Oxazepines And Thiazepines: A Promising Fluorescent Probe For Sensing Of Picric Acid, Materials Today Communications, Volume 35, **2023**, [https://Doi.Org/10.1016/J.Mtcomm.2023.106206](https://doi.org/10.1016/J.Mtcomm.2023.106206). [Impact Factor: 3.8]
- Sofi mubashir, M.Iqbal zargar, Bashir A. Lone, M. Yousuf Dar And **Wajaht A. Shah**. Anthelmintic, Antimicrobial, Antioxidant and Cytotoxic Activity Of Caltha Palustris var Alba. Chinese Journal Of Natural Medicine, **2014**, : 12, 1-6, [Impact Factor: 4.6]
- M.Yousuf Dar, **Wajaht.A.Shah**, Sofimubashir And Manzoor.A.Rather Chromatographic Analysis, Anti-Proliferative And Radical Scavenging Activity of Pinus wallichina Essential Oil Growing In High Altitude Areas Of Kashmir, India Phytomedicine **2012**, 19(13) 1228-1233. [Impact factor: 6.65]
- Mohd. Yousuf Dar, **Wajaht A. Shah**, Manzoor A. Rather, Yasrib Qurishi, Abid Hamid Dar And M. A. Qurishi. Chemical Composition, In Vitro Cytotoxic and Antioxidant Activities Of The Essential Oil And Major Constituents Of Cymbopogon Jawarancusa (Kashmir). Journal of Food Chemistry, **2011**, 129: 1606–1611. [Impact factor: 8.8]
- A. Shaheen, M.I Zarger, **Aijaz A Dar**, Luminescent and self-healing hybrid ionotropic hydrogel beads of ammonium metavanadate and chitosan: promising biomaterial as an antimicrobial agent, efficient dye adsorbent and ascorbic acid sensor, Soft Matter, **2023**, <https://doi.org/10.1039/D2SM01639G>.
- UN Tak, S Rashid, P Kour, Nighat Nazir, M Iqbal Zargar, **Aijaz A Dar**. Bergenia stracheyi extract-based hybrid hydrogels of biocompatible polymers with good adhesive, stretching, swelling, self-healing, antibacterial, and antioxidant properties, International Journal of Biological Macromolecules, 234, **2023**, 123718.
- Pawandeep Kour, Saima Afzal, Adil Gani, Mohammed Iqbal Zargar, Umar Nabi Tak, Showkat Rashid, **Aijaz A Dar**. Effect of nanoemulsion-loaded hybrid biopolymeric hydrogel beads on the release kinetics, antioxidant potential and antibacterial activity of encapsulated curcumin, Food Chemistry, **2022**, 376, 131925.
- Firdaus Ahmad Ahanger, Nighat Nazir, Mohd Sajid Lone, Saima Afzal, **Aijaz A Dar**. Emission Color Tuning and White Light Generation from a Trimolecular Cocktail in Cationic Micellar System with Promising Applicability in the Anticounterfeiting Technology. Langmuir, **2021**, <https://doi.org/10.1021/acs.langmuir.1c00785>.
- MS Lone, S Afzal, OA Chat, PA Bhat, R Dutta, Y Zhang, N Kundu, **Aijaz A. Dar**, Broad Spectrum Tunable Photoluminescent Material Based on Cascade Fluorescence Resonance Energy Transfer between Three Fluorophores Encapsulated within the Self-Assembled Surfactant Systems, The Journal of Physical Chemistry B , **2019**, 123 (45), 9699-9711.
- Feroz A Sofi, Paras Kalra, Adil A. Wani, Sajad A Bhat, Aamir Y Bhat, Kowsar Majid, Pravin P Ingole, **Mohsin A Bhat**, Photoseeded Silver on Two-Dimensional Nanosheets of Cu-Porphyrin Metal–Organic Framework as a Tandem Electrocatalyst for Highly Efficient Electrochemical Reduction of CO<sub>2</sub> to CH<sub>4</sub>, ACS Applied Nano Materials, **2024**, 6 (21), 19689-19700.
- Shazia Nabi, Feroz A. Sofi, Qounsar Jan, Aamir Y. Bhat, Pravin P. Ingole, Maryam Bayati and **Mohsin A Bhat**, The enhanced electrocatalytic performance of nanoscopic Cu<sub>6</sub>Pd<sub>12</sub>Fe<sub>12</sub> heterometallic molecular box engaged cytochrome c. Nanoscale, **2024**, 16 (1), 411-426
- Sarwar A. Pandit, Sajad A. Bhat, Mudasir A. Rather, Feroz A. Sofi, Pravin P Ingole, Zahid M. Bhat, Musthafa O. Thotiyl, Khursheed A. Bhat, Shakeel U Rehman, **Mohsin A Bhat**, Surface active ionic liquid assisted metal-free electrocatalytic-carboxylation in aqueous phase: a sustainable approach for CO<sub>2</sub> utilization paired with electro-detoxification of halocarbons, Green Chem., 2021, 23, 9992-10005.

- Sajad A. Bhat, Nusrat Rashid, Mudasir A. Rather, Sarwar A. Pandit, Ghulam M. Rather, Pravin P Ingole, **Mohsin A Bhat**, PdAg bimetallic nanoalloy-decorated graphene: A nanohybrid with unprecedented electrocatalytic, catalytic, and sensing activities, *ACS Appl. Mater. Interfaces*, **2018**, 10(19), 16376–16389.
- **Mohsin A Bhat**, Nikoloz Nioradze, Jiyeon Kim, Shigeru Amemiya, Allen J Bard, In situ detection of the adsorbed Fe (II) intermediate and the mechanism of magnetite electrodeposition by scanning electrochemical microscopy, *J. Am. Chem. Soc.* **2017**, 139(44), 15891–15899.
- A Kumawat, S Raheem, F Ali, TA Dar, S Chakrabarty, **MA Rizvi**. Organoselenium Compounds as Acetylcholinesterase Inhibitors: Evidence and Mechanism of Mixed Inhibition, *J. Phys. Chem. B* **2021**, 125, 6, 1531–1541.
- T Jan, **M Ahmad Rizvi**, SK Moosvi, MH Najar, S Husain Mir, GM Peerzada. A Switching-Type Positive Temperature Coefficient Behavior Exhibited by PPy/(PhSe)<sub>2</sub> Nanocomposite Prepared by Chemical Oxidative Polymerization, *ACS Omega* **2021**, 6, 11, 7413–7421.
- **MA Rizvi**, Z Hussain, F Ali, A Amin, SH Mir, G Rydzek, RM Jagtap, Bioactive supra decorated thiazolidine-4-carboxylic acid derivatives attenuate cellular oxidative stress by enhancing catalase activity *Phys. Chem. Chem. Phys.*, **2020**, 22, 7942-7951.
- I Nazir, A Qureashi, FA Ganaie, A Bashir, K Fatima, WA Shah, **MA Rizvi** and development of a Sb<sub>2</sub>WO<sub>6</sub>/graphene oxide (2D) nanocomposite as novel electrochemical metal-ion sensor and improved photocatalyst for the degradation of tetracycline, *New J. Chem.*, **2023**, 47, 21067-21080.
- **Aijaz A Dar**, SH Lone, I Ahmad, AA Ahangar, AA Ganie, C Femina. Engineering the solid-state luminescence of organic crystals and cocrystals. *Materials Advances* **2024**, 5 (3), 1056-1064
- AA Ganie, AA Ahangar, A Dhir, AK Gupta, **Aijaz A Dar** Hetero-aggregation-induced tunable emission in multicomponent crystals. *The Journal of Physical Chemistry C* **2023**, 127 (19), 9257-9267
- **Aijaz A Dar**, AA Ganie Irreversible Thermochromism in organic salts of sulfonated Anils. *Crystal Growth & Design* **2020**, 20 (6), 3888-3897
- I Ahmad, **Aijaz A Dar** Switching the Solid-State Emission of Organic Crystals through Coformer Choice and Vapochromism. *The Journal of Physical Chemistry C* **2023**, 127 (37), 18684-18693
- AA Ahangar, AA Malik, I Ahmad, **Aijaz A Dar**, Mechanistic insights into the aggregation-induced emission of halogenated Schiff base fluorescent probes. *Dyes and Pigments* **2023**, 220, 111742

## Placements & Assistance

Teachers of the Department are actively involved in counseling and mentoring of the students for higher studies in national and international institutes of eminence.

Department is active in sanitizing the masters students as and reaches out to college and school children regularly. The outreach activities are focused on attracting the bright students towards applied science and awareness about scope and opportunities of the subject. Students of various schools visit the departmental laboratories and interact with scholars and teachers. Some of the significant activities towards career counseling conducted by the department in recent past include:

- 3-Day Yusuf Hamied Residential Chemistry Camp supported by Royal Society of Chemistry, for the Government school children.
- Chemistry Magic Shows including a motivational lecture and a series of funny and interesting experiments at different schools of the valley
- Outreach activities for rural areas with support of Indian National Young Academy of Sciences, New Delhi.

Department is currently exploring the possibilities of establishing connections with industries and establish MoUs for student internships and placement.



## Placements in the last 5 years (Mandatory field\*)

S.No	Name of the outgoing students placed	Organization in which placed	Type of Position offered	Salary per annum in INR	Year of Placement (2019-2023)
1	<b>Sajid Ahmad</b>	<b>University of Utah</b>	Post-doctoral Fellow	NA	2021
2	Saima Afzal	<b>IUST J and K</b>	Inspire Faculty Fellow	NA	2022
3	Wasim Jeelani Mir	<b>KAUST Saudi Arabia</b>	Post-doctoral Fellow	NA	2020
4	Shabnum Maqbool	<b>University of Cambridge</b>	Post-doctoral Fellow	NA	2023
5	Aiman Nabi	<b>University of Vermont</b>	Ph.D.	NA	2021
6	Nisar A. Dangroo	<b>IUST J and K</b>	Assistant Professor	NA	2022
7	Tahir Ahmad Mir	<b>University of Paris</b>	Ph.D.	NA	2024
8	Imtiyaz A. Bhat	<b>IUST J and K</b>	Assistant Professor	NA	2022
9	Noor-u-din Reshi	<b>IUST J and K</b>	Assistant Professor	NA	2024
10.	Dr. Shahnawaz Rafiq		Assistant Professor	NA	2024

## List of Prominent Recruiters

State and Central University  
Central and State Government  
JK-Public Service Commission  
Indian Institutes of Technology  
Research Laboratories

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