CURRICULUM VITAE

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EDUCATION

UNIVERSITY		
University of Bath, Bath, U.K.	Ph.D. in Organometallic Chemistry	1994-1998
Yale University, New Haven, CT, USA	MS (Organometallic Chemistry)	1992-1994
University of Cambridge, UK	MA (Cantab) in Chemistry	1989-1992
SCHOOL		
Frankfurt International School, Frankfurt, West Germany	International Baccalaureate Diploma	1987-1989
Delhi Public School, New Delhi, India	All India Secondary School Examination (Central Board of Secondary Education)	1987

WORK EXPERIENCE

March 2018-present	**Postgraduate Teacher** at Alliance World School, Noida, India (Cambridge International Assessment Education)
December 2018-March 2019	**Consulting Content Writer at Arsiga konics,** Faridabad, India
March 2016- July 2018	**Associate Professor,** Shree Guru Gobind Singh Tricentenary (SGT) University, Gurugram, India
July 2011- April 2015	**Associate Professor**, Shiv Nadar University, Greater Noida, India
July 2009 – June 2011	**Assistant Professor**, Sharda University, Greater Noida, India
July 2008- June 2009	**Manager**, Shasun Pharmaceuticals, Chennai, India
March 2006 – June 2008	**Deputy Team Leader**, Pesticides India (PI) Ltd., Udaipur, Rajasthan, Udaipur, India
August 2002-September 2005	**Postdoctoral Researcher** at the University of Kentucky, Lexington, KY, U.S. A
June 2000 - July 2002	**Alexander von Humboldt Postdoctoral Fellow** at the University of Göttingen, Germany

January 1999 - May 2000	**Research Associate** at Indian Institute of Technology, Delhi, India
July-December 1998	**Research Scientist** at Ranbaxy Research Laboratories, New Delhi, India
October 1994 - February 1998	**Postgraduate Researcher** and **Natural Sciences Demonstrator** at the University of Bath, United Kingdom
August 1992 - September 1994	**Graduate Student Researcher** and **Teaching Assistant** at Yale University, United States
June 1991 - September 1991	**Teacher** at Delhi Public School, New Delhi, India

SCHOLARSHIPS/FELLOWSHIPS/AWARDS

2022	**The first Lavendar Festival** took place in the valley of Bhaderwah, Jammu & Kashmir under Aroma Mission-2 of the Indian Government and was organized by CSIR- Indian Institute of Integrative Medicine (IIIM). The objectives of the festival were to: • Acknowledge the emergence of Bhaderwah as the Lavendar capital of India. • Enable interaction between scientists, technologists, progressive farmers, and agricultural entrepreneurs. • Increase the cultivation of lavender to 1500 hectares by 2024. • Felicitate the building of the first National Institute of High-Altitude Medicine. • Generate jobs in the Bhaderwah region. • Open new avenues for research and development. The 'purple revolution' was launched in 2016 in Bhaderwah to promote lavender cultivation under the Aroma Mission of CSIR-IIIM through the Ministry of Science and Technology. Climactic and soil conditions of Bhaderwah region are ideal for lavender cultivation.
2018	**Happiness Curriculum** is an educational program for school children studying in grades nursery to VIII. This curriculum is operational in schools run by the Government of Delhi since July 2018. The main objectives of introducing this curriculum are: • Improve the mental well-being of pupils. • Make students aware of mindfulness, socio-emotional learning, critical thinking, problem-solving, and relationship-building. • Build emotional awareness that will assist in sound decision-making and being focused on life. The learning outcomes of the curriculum are awareness and focus, critical thinking and reflection, socio-emotional skills, and building of a confident and pleasant personality.

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	Teachers use a manual to assist students in exploring the following questions: '**What makes me happy? How can I provide happiness to others?'** Teachers facilitate students in understanding their thoughts and emotions about themselves, their families, environment, societies, and world at large. The various techniques used in the curriculum are mindfulness, reflective stories, interactive activities, and emotional expression that endow students with the necessary skills and mindset to answer the central questions of the curriculum.
2015	**India International Science Festival** is a biannual festival that was initiated in 2015. It is an initiative of the Ministry of Science and Technology and Ministry of Earth Sciences, Government of India in association with *Vinjana Bharti*, a science movement with a patriotic spirit led by eminent Indian scientists. The main objectives of the festival are to • Instill scientific temper among the masses and across the entire societal fabric. • Engage the public with science and demonstrate how science, technology, engineering, and mathematics (STEM) can provide us solutions to improve our lives. • Showcase Indian contributions to the public in the field of Science & Technology over the years. • Provide platforms for young scientists for exchange of knowledge and ideas that will foster novel inventions of global relevance. • Provide opportunities to common people and the scientific fraternity in India and abroad to collaborate in various fields of scientific research through creative programs and activities. • Allow scientists and people from other strata of society to experience the joy of working together for the welfare of human civilization.
2018	**Mentored** an undergraduate student for the Prime Minister's Swacch Bharat (Clean India) Summer Internship
2014	**Invited Lecture** at the International Symposium on Conservation and Management of Pollinators for Sustainable Agriculture and Ecosystem Services, National Agricultural Science Complex, Pusa, New Delhi, September 24-26, 2014: Recollections from a field trip to the Yamuna Biodiversity Park, Wazirabad.
2014	**Keynote/Invited** lecture at the National Conference on "Earth and environmental: Pollution and Prevention", January 2014: *Exhibitions as a Pedagogical Tool to Advance Education and Awareness*. Organized by Amity University in association with Ministry of Earth Sciences, Noida, India

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2013	**Invited poster:** Bhandari S. 'Blended Learning: Employing exhibitions as a pedagogical tool to advance education and awareness', FICCI Higher Education Summit 2013, 2013, New Delhi, India.
2013	NNMRS (National Natural Resources Management System) course on 'Remote Sensing (RS) and Geographic Information Software (GIS) Technology' sponsored by Indian Space Research Organization (ISRO) at Indian Institute of Remote Sensing (IIRS), Dehradun, May 6th-June 28th, 2013.
2003-4	Selected for L'Oreal Women in Science Fellowship (FWIS) Program
2002-2005	Postdoctoral Fellowship at University of Kentucky, Lexington, USA
2000-2002	Alexander von Humboldt Postdoctoral Fellowship at Universität Göttingen, Germany
1999	Young Scientist's Award from the Department of Science and Technology, India
Jan' 1999 - May 2000	CSIR (Council of Scientific and Industrial Research) Fellowship at IIT, Delhi, India
1994-1998	Fellowship/Teaching assistantship at Bath University, UK
1992-1994	Fellowship/Teaching assistantship at Yale University, New Haven, CT, USA
1989	Nominated as Fellow of Cambridge Commonwealth Trust
1989-1992	Cambridge Nehru Centenary Scholarship
1989	Otis Thorndike Award for the highest-grade point average, Frankfurt International School, Frankfurt, West Germany
1989	American Women's Club Award for being an All-Rounder, Frankfurt International School, Frankfurt, West Germany
1986	Junior Science Talent Scholarship, Directorate of Education: Delhi Administration, Delhi
1986	Sanskrit Scholarship, Directorate of Education: Delhi

RESEARCH EXPERIENCE

2016-Now	Shree Guru Gobind Singh Tricentenary University, Gurugram, India 1. Research in Pedagogical tools and Cognitive Science 2. Geospatial research with the aid of Remote Sensing and Geographic Information Software
2011-2015	Shiv Nadar University, Greater Noida, India 1. Research in Pedagogical tools and Cognitive Science 2. Geospatial research with the aid of Remote Sensing and Geographic Information Software 3. Metal phosphide nanoparticles as corrosion-resistant reagents
2009-2011	Sharda University, Greater Noida, India Research in pedagogical tools and Cognitive Science
2008-2009	Shasun Pharmaceuticals, Chennai, India

	Involved in Contract Research and Manufacturing Services (CRAMS) Research and Development This involved knowledge and application of named reactions, organic reagents, conditions for organic reactions, and stereochemistry; interpretation of ^{1}H and ^{13}C NMR spectra, LC-MS, HPLC among other techniques. • Prepared feasibility reports • Important Reactions performed ✓ Friedel craft's acylation ✓ Buchwald-Hartwig amination ✓ Resolution of diastereomers ✓ Oxidation of aldehyde to carboxylic acid with Jones reagent ✓ Bromination with N-Bromosuccinimide (NBS) ✓ Addition of a protecting group with *p*-toluene sulfonic acid (PTSA)
2006-2008	Pesticides India, Udaipur, India Involved in CRAMS Research and Development This involved knowledge and application of named reactions, organic reagents, conditions for organic reactions, and stereochemistry; interpretation of ^{1}H and ^{13}C NMR spectra, LC-MS, HPLC among other techniques. Three of the projects I was involved in were sent to the pilot plant and then to the plant. • Prepared feasibility reports • Prepared Tentative Operating Procedure (TOP), Standard Operating Procedure (SOP) Reports and Material Balance Sheets • Translated technical documents in German to English • Important Reactions performed ✓ Ring opening of epoxides with primary amines ✓ Chlorination of alcohol with thionyl chloride ✓ Piperazine formation ✓ Preparation of Grignard reagent from bromobenzene ✓ Preparation of a tertiary alcohol (Carbinol) from a Grignard reagent (Phenyl Magnesium Bromide) and a ketone ✓ Preparation of a Dione from maleic anhydride and hydrazine hydrate ✓ Preparation of mercapto-phenols from phenols and derivatives of phenols ✓ Azidation
August 2002-September 2005	University of Kentucky, Lexington, KY, USA. Involved in several organometallic, environmental chemistry, materials and nanoscience projects

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	1. Synthesis of tetra metallic molecules [Al{μ-OEt)$_2$AlR$_2$}3] (R = Me (1), Et, ^{i}Bu) with a tri-diamond or Mitsubishi structure and their decomposition to nano-alumina + characterization of the nano-alumina with solid-state techniques. This work is significant both in terms of syntheses of novel organometallic compounds and research in materials. 2. Synthesis and characterization of five-coordinate organo Aluminum compounds. These compounds have potential in catalyst development. 3. Synthesis and characterization of novel Sulphur-nitrogen based ligands and employing them for Hg remediation. This work has applications in environmental chemistry while novel Sulphur-nitrogen based ligands are of interest in organic chemistry. 4. Uranyl remediation with boron agents and characterization of the precipitates with solid-state techniques. This research project has immense potential in handling and storage of nuclear waste. Characterization of precipitates has applications in materials research.
June 2000 - July 2002	Universität Göttingen, Göttingen, Germany 1. Synthesizing organometallic models of solid-supported metal complexes employed as catalysts. 2. Synthesizing low-co-ordinate organo Nickel complexes and investigating their potential catalytic activity. Involved in hard-core organometallic synthesis in stringent air- and moisture-conditions. These projects required thorough knowledge of glove box and Schlenck techniques and evaluation of products for catalytic activity. This work has immense potential in the development of novel catalysts.
Jan' 1999 - May 2000	Indian Institute of Technology, Delhi, India Research on organo Tellurium and organo Selenium compounds at the Indian Institute of Technology, Delhi. This involved the synthesis of organometallic air-sensitive compounds.
July-Dec'1998	Ranbaxy Research Laboratories; Delhi, India Research in drug synthesis. This project required synthesis of new organic molecules, separation and purification of products by means of column chromatography, and evaluation of the compounds for biological activity.
1994-1998	Bath University, Bath, UK Research on organometallic tetrazoles 1. Synthetic studies on organo Tin tetrazoles and organo Tin thio-tetrazoles 2. Synthetic studies on organ Lead tetrazoles 3. Synthetic studies on organo Thallium tetrazoles This study involved the syntheses of various organometallic tetrazoles by a variety of routes, e.g., cycloaddition, condensation, and salt elimination. The structural studies on these compounds were of particular interest as they revealed extensive supramolecular arrays.

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1992-1994	Yale University, New Haven, CT, USA. 1. Research on transition metal-boryl compounds 2. Mechanistic studies on addition of catecholborane to Ruthenium-alkyls Synthesis and mechanism studies on tungstanocene boryls These involved the synthesis of air-sensitive organometallic molecules by means of Schlenk techniques and extensive kinetic experiments to investigate mechanism of reactions.
1991-1992	Cambridge University, Cambridge, UK Supervised short duration undergraduate project on X-ray crystallography.

TEACHING EXPERIENCE

2019-present	Alliance World School, Noida, India • Teaching AS & A-level and IGCSE Chemistry
2016- 2018	Shree Guru Gobind Singh Tricentenary University, Gurugram, India • Taught '**Inorganic Chemistry'** to M.Sc. (Chemistry) I Year students Topics includes stereochemistry and bonding in main group compounds; thermodynamic and kinetic aspects of metal complexes; ligand substitution in octahedral complexes; ligand substitution in square planar complexes; isopoly and heteropoly acids and salts of Mo and W; crystal structures; metal-ligand bonding; electronic spectra of transition metal complexes; magnetic properties of transition metal complexes; metal clusters; and metal-π clusters. • Taught '**General Spectroscopy'** to M.Sc. (Chemistry) I Year students Topics included electromagnetic radiation, interaction of electromagnetic radiation with matter, regions of the spectrum, the width and intensity of spectral transitions; principles of rotational spectra; principles of vibrational and vibrational-rotational spectra; principles of electronic spectra and NMR spectra; principles of electronic absorption spectroscopy; application of infra-red spectroscopy to inorganic compounds. • Taught '**Inorganic Chemistry'** to B.Sc. (Chemistry) III Year students Topics included metal-ligand bonding in transition metal complexes; thermodynamic and kinetic aspects of metal complexes; magnetic properties of transition metal complexes; electronic spectra of transition metal complexes; organometallic chemistry; acids and bases (HSAB Concept); silicones and phosphazenes; and Bioinorganic Chemistry. • Taught '**Inorganic Chemistry'** to B.Sc. (Chemistry) II Year students Topics included chemistry of I row elements; chemistry of II and III row elements; coordination compounds; non-aqueous solvents; chemistry of lanthanides and actinides; theory of qualitative and quantitative inorganic analysis; and solid-state chemistry.

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	• Taught '**Organic Chemistry'** B.Sc. (Chemistry) II Year students Topics included alcohols, epoxides, phenols, ultra-violet spectroscopy and carboxylic acids and acid derivatives. • Taught '**Physical Chemistry'** to B.Sc. (Chemistry) I Year students Topics included fundamentals of kinetics and electrochemistry. • Taught '**Applied Chemistry'** to B.Tech. I Year students Same syllabus as Shiv Nadar and Sharda Universities
	Shree Guru Gobind Singh Tricentenary University, Gurugram, India **Practical courses taught** • M.Sc. (**Inorganic Chemistry**) I Year *1. Qualitative Analysis:* a) Less common metal ions- Tl, Se, Te, Mo, W, Ti, Zr, U and V b) Insoluble- Oxides (WO_3, Silica, Alumina); Sulphates (Lead Sulphate, Barium Sulphate, Strontium Sulphate and Calcium Sulphate); Halides (Calcium fluoride and silver halides) 2. *Quantitative Analysis:* a) Separation and determination of two metal ions such as Ag- Cu, Cu- Ni, Cu- Zn, Ni- Zn, Cu-Fe etc. involving volumetric and gravimetric methods. b) Determination of Ferrous, Oxalate, Nitrite etc. by Cerimetry • B.Sc. (Chemistry) II Year **Inorganic Chemistry** *Gravimetric Analysis* 1. Quantitative estimations of Cu^{2+} as copper thiocyanate 2. Quantitative estimations of Ni^{2+} as Ni – dimethylglyoxime *Colorimetry* 3. To verify Beer - Lambert law for $KMnO_4/K_2Cr_2O_7$ and determine the concentration of the given $KMnO_4/K_2Cr_2O_7$ solution. 4. Preparation of Cuprous chloride, Prussian blue from iron fillings, tetra ammine cupric sulphate, chrome alum, potassium tri oxalate chromate (III). **Organic Chemistry** 5. Systematic identification (detection of extra elements, functional groups, determination of melting point or boiling point and preparation of at least one pure solid derivative) of the following simple mono and bifunctional organic compounds: Naphthalene, anthracene, acenaphthene, benzyl chloride, p-dichlorobenzene, m-dinitrobenzene, p-nitrotoluene, resorcinol, hydroquinone, α -naphthol, β -naphthol, benzophenone, ethyl methyl ketone, benzaldehyde, vanillin, oxalic acid, succinic acid, benzoic acid, salicylic acid, aspirin, phthalic acid, cinnamic acid, benzamide, urea, acetanilide, benzanilide, aniline hydrochloride, p-toluidine, phenyl

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salicylate (salol), glucose, fructose, sucrose, o-, m-, p- nitroanilines, thiourea.

Physical Chemistry

6. To determine the Critical Solution Temperature (CST) of phenol – water system.
7. To determine the solubility of benzoic acid at various temperatures and to determine the ΔH of the dissolution process
8. To determine the enthalpy of neutralization of a weak acid/weak base vs. strong base/strong acid and determine the enthalpy of ionization of the weak acid/weak base.
9. To determine the enthalpy of solution of solid calcium chloride
10. To study the distribution of iodine between water and CCl_4.

- B.Sc. (Chemistry) I Year:

Inorganic Chemistry

Volumetric Analysis

1. Redox titrations: Determination of Fe^{2+}, $C_2O_4^{2-}$ (using $KMnO_4$, $K_2Cr_2O_7$)
2. Iodometric titrations: Determination of Cu^{2+} (using standard hypo solution).
3. Complexometric titrations: Determination of Mg^{2+}, Zn^{2+} by Ethylene Triamine Tetra acetic acid (EDTA).

Paper Chromatography

4. Qualitative Analysis of the any one of the following Inorganic cations and anions by paper chromatography (Pb^{2+}, Cu^{2+}, Ca^{2+}, Ni^{2+}, Cl^-, Br^-, I^- and PO_4^{3-} and NO^{3-}).

Organic Chemistry

5. Preparation and purification through crystallization or distillation and ascertaining their purity through melting point or boiling point
   (I) Iodoform from ethanol (or acetone)
   (ii) *m*-Dinitro benzene from nitrobenzene (use 1:2 conc. HNO_3:H_2SO_4 mixture if fuming HNO_3 is not available)
   iii) *p*-Bromo-acetanilide from acetanilide
   iv) Dibenzalacetone from acetone and benzaldehyde
   v) Aspirin from salicylic acid.
6. To study the process of sublimation of camphor and phthalic acid.

Physical Chemistry

7. To determine the specific reaction rate of the hydrolysis of methyl acetate/ethyl acetate catalyzed by hydrogen ions at room temperature.
8. To prepare arsenous sulphide sol and compare the precipitating power of mono-, bi–and trivalent anions.

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	9. To determine the surface tension of a given liquid by drop number method. 10. To determine the viscosity of a given liquid and specific refractivity of a given liquid.
	Shree Guru Gobind Singh Tricentenary University, Gurugram, India • Prepared **question papers** for B.Sc. (Organic, Inorganic, Physical), M.Sc. (Inorganic) and PhD Entrance examinations (Inorganic) as per **Internal Quality Assurance Cell (IQAC) guidelines**. • Prepared different types of **assessment questions** – **multiple choice questions** (single response, multiple response, true/false, matching, sequencing, assertion-reasoning, and text numerical), **very short answer, short answer** and **long answer** types for mid-term and final examinations as per **IQAC guidelines.** • Prepared the **Department of Chemistry IQAC annual report** 2016-17. • Prepared and compiled **curriculum sheets** for the newly implemented choice-based credit-based (CBCS) syllabi by the University Grants Commission (UGC). Curriculum sheets were prepared for chemistry courses of B.Sc. (Hons), M.Sc. and MTech. (Nanoscience and Nanotechnology). • Conducted **field trips** to Asola Bhatti Wildlife Sanctuary, Faridabad, India on 21st February, 2017 and 4th August, 2017. • Given two stalls on the following topics in the **University Techfest**, 9th to 11th November, 2017. **Bravais Lattice Model:** **Context:** • When the discrete points are atoms, ions, or polymer strings of solid matter, the Bravais lattice concept is used to formally define a *crystalline arrangement* and its (finite) frontiers. • A crystal is made up of a periodic arrangement of one or more atoms (the *basis*) repeated at each lattice point. • In three-dimensional space, there are 14 Bravais lattices. These are obtained by combining one of the seven lattice systems with one of the centering types. The centering types identify the locations of the lattice points in the unit cell as follows: • Primitive (P): lattice points on the cell corners only (sometimes called simple) • Base-centered (A, B, or C): lattice points on the cell corners with one additional point at the center of each face of one pair of parallel faces of the cell (sometimes called end-centered) • Body-centered (I): lattice points on the cell corners with one additional point at the center of the cell

- Face-centered (F): lattice points on the cell corners with one additional point at the center of each of the faces of the cell

Setup and demonstration:

- A poster depicting all the Bravais lattices was displayed.
- Models of Bravais lattices was displayed with balls/sticks and apples/oranges will be displayed.

Importance:

Considering maximum symmetry and minimum size, only 14 space lattices belonging to 7 crystal systems are possible.

Faculty Member: Dr Sonali Bhandari

Students:

Neha, Usha, Priya, Bhavna, Laxit, Naman
Pankaj, Pawan, Naveen
All are B.Sc. V semester non-medical students

Colours in Transition Metal Complexes:

Context:

- **Crystal Field Theory** (**CFT**) is a model that describes the breaking of degeneracies of electron orbital states, usually *d* or *f* orbitals, due to a static electric field produced by a surrounding charge distribution (anion neighbors).
- This theory has been used to describe various spectroscopies of transition metal coordination complexes, in particular optical spectra (colors).
- CFT successfully accounts for some magnetic properties, colours, hydration enthalpies, and spinel structures of transition metal complexes, but it does not attempt to describe bonding.
- CFT was developed by physicists Hans Bethe and John Hasbrouck van Vleck in the 1930s.
- CFT was subsequently combined with molecular orbital theory to form the more realistic and complex ligand field theory (LFT), which delivers insight into the process of chemical bonding in transition metal complexes.

Setup and demonstration:

- CFT & MO theories was described in 3 to 4 posters.
- The full array of colours obtained with transition metal complexes was shown.
- Corresponding wavelengths of the samples measured with a spectrophotometer was displayed.
- A synchronous array of colours obtained in nature was displayed.

Importance:

	CFT explains important properties of transition metal complexes- variable oxidation state, colour, magnetism, crystal field stabilization energy etc. **Faculty Member:** Dr Sonali Bhandari **Students:** Keertika, Mahima, Shivam (M.Sc. Chemistry I semester) Sangeeta, Taruna, Beenu, Ruchi (M.Sc. Chemistry III semester)
2011-2015	Shiv Nadar University, Greater Noida, India • Taught '**Applied Chemistry**' to I Year B. Tech. students Topics included **Water Technology** – impurities in water, hardness of water, equivalents of Calcium Carbonate, units of hardness, disadvantages of hard water, scale and sludge formation in boilers, caustic embrittlement, boiler corrosion, priming and foaming, softening methods, municipal water, desalination of brackish water; **Polymers** – nomenclature, functionality, classification, types of polymerization, mechanism of addition polymerization, important thermoplastic and thermosetting resins, conducting polymers; **Electrochemistry** – acids and bases, redox reactions, electrode potential, electrochemical cell, emf of an electrochemical cell, concentration cells, reference electrodes, batteries, and fuel cells; **Corrosion** – dry and wet corrosion, mechanism of electrochemical (wet) corrosion, Galvanic and concentration cell corrosion, passivity, Galvanic series, factors influencing corrosion and corrosion control; **Fuels and Combustion** – classification, calorific value, characteristics of a good fuel, Bomb calorimeter, theoretical calculation of calorific value of a fuel. • Laboratory experiments for '**Applied Chemistry'** included 1. Determination of Ca^{2+}, Mg^{2+} Hardness of water using EDTA solutions 2. Determination of alkalinity of water sample 3. Determination of Dissolved Oxygen (DO)of given water sample 4. Determination of strength of HCl solution by titrating it against NaOH solution volumetrically and conductometrically 5. Determination of strength of $CuSO_4$ solution with hypo solution 6. Determination of Ferrous Ammonium sulphate solution with the help of $K_2Cr_2O_7$ 7. Determination of free chlorine in water sample 8. Determination of residual chlorine in water 9. Determination of melting point of the melting and eutectic point of a two-component system by using a cooling curve method 10. Determination of Viscosity of lubricant by Redwood Viscometer 11. Preparation of phenol-formaldehyde and urea-formaldehyde resin 12. Determination of Total Dissolved Solids (TDS) of water samples from different sources

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13. Determination of concentration of $KMnO_4$ solution spectrophotometrically
14. Determination of proximate analysis and calorific value of coal
15. Determination of calorific value of fuel using Bomb calorimeter
16. Determination of amount of Sodium and Potassium in a given water sample by Flame Photometer
17. Estimation of total Iron in Iron ore
18. Estimation of Calcium in dolomite and limestone

- Taught '**Physical Chemistry**' to I Year B.S. students.
  Topics included **Spectroscopy** – ultra-violet, infrared, NMR spectroscopy and mass spectrometry; E**lectrochemistry** - acids and bases, redox reactions, electrode potential, electrochemical cell, emf of an electrochemical cell, concentration cells, reference electrodes, and Gibb's free energy; **Phase rule** – derivation of Phase Rule and the water system.
- Taught the compulsory UGC (University Grants Commission) recommended '**Environmental Studies'** course to I year B. Tech. and B.S./B.A. students.
  Topics included Different types of pollution- air, water, soil, solid-state, nuclear, marine, noise, thermal; Role of an individual in prevention of pollution; Human populations and the environment; Population growth variation among nations; Population explosion; Environment and Human health; Malthus' theory of Human population; Human Rights; Amnesty International.
- Conducted **Mandatory Field Trips (according to UGC Guidelines)** to Yamuna Biodiversity Park, Wazirabad, Delhi; Aravalli Biodiversity Park, Vasant Vihar, Delhi; Okhla Bird Sanctuary, Delhi; and Bharatpur Bird Sanctuary, Bharatpur, Rajasthan.
- Taught compulsory UGC recommended '**Research Methodology'** to I Year Ph.D. students
  Topics included Research – meaning, objectives, motivation, types, significance; Research methods vs. methodology; Research and scientific method; Importance of knowing how research is done; Research process – Formulating the research problem, extensive literature survey, development of a working hypothesis, preparing the research design, determining sample design, collecting data, analysis of data, hypothesis testing, generalizations and interpretations, preparation of the report or thesis, criteria for good research, and problems encountered by researchers in India.
- Taught '**Advanced Spectroscopy**' to I Year Ph.D. students.
  Topics included principles of Nuclear Magnetic Resonance (NMR), Infra-red (IR), ultra-violet (UV) spectroscopy and mass spectrometry.

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2009-2011	Sharda University, Greater Noida, India • Taught the compulsory UGC (University Grants Commission) recommended **Environmental Studies** course to I year B. Tech. students. 'Environmental Studies' included Nature of Environmental Studies, Natural Resources, and Associated Problems; **Definition, scope and importance**; Need for public awareness; Renewable and Non-renewable Resources. **Natural resources and associated problems**; Forest Resources, Water Resources, Mineral Resources, Energy Resources, and Food Resources; **Different types of pollution**- air, water, soil, solid-state, nuclear, marine, noise, thermal; Role of an individual in prevention of pollution; **Human populations and the environment**; Population growth variation among nations; Population explosion – Family welfare programs; Environment and Human health; Human Rights; Value Education; HIV/AIDS; Women and Child welfare; Role of Information Technology in Environment and Human health. • Taught **'Applied Chemistry'** to I Year B.Tech. (Civil Engineering) students Topics included **Water Technology**- Water quality parameters - Definition and expression, Hardness of Water - Temporary and Permanent hardness, Disadvantages of Hard Water. Estimation of hardness (EDTA method) and Alkalinity (Titration method), Water for Domestic Use - Sedimentation, Coagulation, Filtration, Disinfection - Sterilization, Chlorination, Break point chlorination, Ozonation. Water for Industrial Use- Water for Steam Making, Boiler Troubles - Carry Over, Priming and Foaming, Boiler Corrosion, Scales and Sludges, Caustic Embrittlement. Water softening (zeolite) – De mineralization (Ion-exchangers) and desalination (Reverse Osmosis), Calgon Conditioning; **Ceramic materials,** elementary ideas of electronic and photonic ceramics; superconductors; Composition and properties of Glass, Refractories, Cement and Steel; **Polymers:** Polymerization and Polymers. Classification, linking, mechanism and engineering uses of polymers. Thermoplastics and Thermosetting resins; Elastomers and synthetic Fibers. Ion-exchange resins. Biopolymers, Conducting Polymers; **Corrosion:** Definition, Examples, Types of Corrosion, Electrochemical Theory of corrosion, Factors Effecting Corrosion, Control of Corrosion. • Taught '**Inorganic and Physical Chemistry'** to II Year B.Sc. students. Topics included acids and bases, transition elements, lanthanides and actinides, coordination compounds, liquids, solutions, phase rule, phase diagrams of water and Sulphur. • Taught **Nanomedicine** to MTech. (Nanotechnology) students The aim of this course was to teach the medical applications of nanotechnology. Approaches included medical use of nanomaterials, Nano electric biosensors and applications of molecular nanotechnology.

	• Taught **Bio nanotechnology** to MTech. (Biotechnology) students Topics included biomolecules in action; biomolecular design and biotechnology; structural and functional principles of Bio nanotechnology; and Bio nanotechnology Today.
2004 (January-May)	University of Kentucky, Lexington, KY • Taught general chemistry courses: **'Introduction to Organic Chemistry'** and the **workshop** associated with **'General Chemistry II'**. • 'Introduction to Organic Chemistry' included the saturated hydrocarbons; unsaturated hydrocarbons- alkenes, alkynes, and aromatics; alcohols, phenols, thiols and ethers; aldehydes and ketones; carboxylic acids and carboxylic acid derivatives; amines and amides; carbohydrates; protein structure and function. • The 'General Chemistry II' workshop was focused on increasing the problem-solving skills of the student and fostering an environment of group study. This workshop included physical properties of solutions, chemical kinetics, chemical equilibrium, acids and bases, acid-base equilibrium and solubility equilibria, introduction to thermodynamics, thermodynamics, electrochemistry, metallurgy and the chemistry of metals, transition metal chemistry and coordination compounds, and nuclear chemistry.
1999 (January-May)	Indian Institute of Technology, Delhi, India Taught inorganic undergraduate and M.Sc. laboratories, and gave PhD. lectures in **'Spectroscopic Methods'**. 'Spectroscopic Methods' included practical spectroscopic techniques, *e.g.*, Nuclear Magnetic Resonance (NMR), Infra-Red (IR) and Mössbauer spectroscopy. Teaching Taught inorganic undergraduate and M.Sc. laboratories, and delivered PhD. lectures in **'Spectroscopic Methods'**. 'Spectroscopic Methods' included practical spectroscopic techniques, *e.g.*, Nuclear Magnetic Resonance (NMR), Infra-Red (IR) and Mössbauer spectroscopy.
1994-1998	Bath University, United Kingdom Taught **inorganic, organic and physical chemistry laboratories** and **problem-solving classes** at the undergraduate level. Supervised senior undergraduates in planning and execution of short-term research projects. • Problem-solving classes covered general chemistry topics, e.g., physical properties of solids, liquids, gases and solutions; fundamental properties of an atom; atomic number, mass number and isotopes; atomic orbitals; trends in the periodic table; bonding models in inorganic chemistry, reduction and oxidation; chemical kinetics and thermodynamics. Also, taught an 'organic mechanisms' class.

	• Inorganic chemistry laboratories involved acid and base titration, quantitative analysis, electrochemistry, synthesis and analysis of coordination compounds, and reaction rate. • Organic chemistry laboratories included synthesis of organic compounds and their purification employing thin layer and column chromatography. • Physical chemistry laboratories included packing of spheres (cubic and hexagonal close-packing), packing of spheres model applied to the structures of elements, ionic lattices and defects in solid state lattices. • **Short-term research projects** included synthesizing novel organometallic compounds and characterizing them by NMR and IR spectroscopy, elemental analysis, and X-ray crystallography.
1992-1994	Yale University, New Haven, CT • Taught **freshman chemistry laboratory** and conducted **freshman problem solving classes.** Chemistry laboratory involved acid and base titration, quantitative analysis, electrochemistry, synthesis and analysis of coordination compounds. Emphasis was put on safety in the laboratory, laboratory clean up and maintenance, significant figures, standard deviation and error analysis. Problem solving classes addressed general chemistry topics similar to those to those taught in Bath University.
1991	Delhi Public School, New Delhi, India Taught **high school chemistry** for two months.

ADMINISTRATIVE EXPERIENCE

August 2017-July 2018	**Head of Department of Chemistry**, Shree Guru Gobind Singh Tricentenary University
August 2017-July 2018	**Member of Internal Quality Assurance Cell (IQAC) Consultancy Group,** Shree Guru Gobind Singh Tricentenary University
August 2017-July 2018	**Member of University Research Committee,** Shree Guru Gobind Singh Tricentenary University
August 2016-July 2018	**Member of SGT Core Research Committee,** Shree Guru Gobind Singh Tricentenary University
August 2016-July 2017	**Batch-in-charge** of M.Sc. (Chemistry) I Year students, Faculty of Physical Sciences, Shree Guru Gobind Singh Tricentenary University
August 2011	**Founding Warden** of the girls' hostel, Shiv Nadar University
July 2009-December 2010	**Hostel Warden** for the girls' hostel, Sharda University
December 2009	**Head Examiner** for I Year B.Tech. 'Environmental Studies' (~ 500 students), Sharda University

OTHER SKILLS

Languages	English, Hindi, Bengali, conversational Sanskrit and German
Computer skills	Competent in the use of Windows, Microsoft Word, Microsoft Power Point, Microsoft Excel, Chemistry Windows drawing package, BLACKBOARD, ARCGIS10, ILWIS9.3 and ERDAS9.2 and several other packages. Well-versed in the use of several databases: Cambridge Crystallography, Beilstein, Gmelin, Ovid, Chromcircle, Pioneer, Drug Launches, Patents International, BIDS, CACD, SciFinder, Daresbury Databases (Specinfo) and Science Citation Index.
Instrumental skills	Handling Mössbauer spectrometer, glove box, Schlenk lines, Infra-Red, JEOL JNM/GX-270 FT NMR spectrometer, JEOL JNM/EX-400 FT NMR spectrometer (collecting ^{1}H, ^{13}C and multinuclear NMR spectra), UV-vis spectrophotometer, TA Instruments Hi Res TGA 2950 Analyzer (thermogravimetric analysis), Rigaku Diffractometer using CuKα radiation (X-ray diffraction), Inductively Coupled Plasma Atomic Absorption spectrometer (metal analysis), Cold Vapor Atomic Absorption/Fluorescence spectrometer (mercury analysis), Brunauer-Emmet-Teller Micromeritics ASAP2000 Accelerated Surface Area and Porosimetry Analyzer (surface area measurement).
Instructional Design skills	The process of systematically designing, developing and delivering instructional material in an effective, engaging and inspiring way leading to either acquisition of knowledge or alteration of behaviour. The process involves determining the type of the learner, defining the end goal of instruction, and creating effective learning material to achieve the outlined goals. The outcome of this instruction may be measurable or completely concealed. Several instructional design models exist but most are based on the ADDIE model with the five phases: Analysis, Design, Development, Implementation, and Evaluation.
Teamwork	• As Head Examiner, I had to coordinate with a team of five examiners to mark, total the marks and cross-check 500 answers sheets of 'Environmental Studies' and declare the end semester results in two weeks. • As a Hostel Warden, I had to work with a team of support staff (security guards, plumber, electrician, cooks and cleaners) for efficient management of ~200 students. • As the Head of the Department, I had to coordinate with five other chemistry faculty to ensure smooth running of 21 courses (theory and practical) across three faculties, maintenance of student records,

	timely conductance of assessments, submission of question papers, and marking of exam sheets. • Prepared and compiled curriculum sheets for the newly implemented CBCS (choice-based credit-based) syllabi implemented by the UGC (University Grants Commission) for B.Sc. (Hons) Chemistry, M.Sc. Chemistry and M.Tech. (Nanoscience and Nanotechnology). • Conducted field trips to Yamuna Biodiversity Park, Aravalli Biodiversity Park, Okhla Bird Sanctuary, Bharatpur Bird Sanctuary and Asola Bhatti wildlife sanctuary of ~350 students (in batches of 50). • Conducted 'poster and model' exhibitions on environmental themes with ~350 students. • Given two stalls on scientific themes in the University Techfest with postgraduate and undergraduate students. • Conducted Induction, Orientation, Faculty Development, Guest Lecture programs and Industrial Visit along with other faculty members of the Faculty of Physical Sciences. • Organized a Food Fair and Interdisciplinary Entrepreneurial project at Alliance World School, Noida, as a team. • Actively participated in aerobics, bible studies and spiritual fellowship programs. • Conducted research projects in Professor David Atwood's laboratory, the Indian Institute of Remote Sensing (Indian Space Research Organization), Ranbaxy Research Laboratories, Pesticides India Ltd. and Shasun Pharmaceuticals as a team.
Editing skills	• Edited journal articles in chemistry and material sciences for Cactus Communications since January 2022. Editing of articles included issues regarding language, structure, flow of the manuscript, and formatting according to journal requirements. Besides, editing services addressed challenges faced by both non-native and native speakers of English desiring to get published.
Teaching International Baccalaureate (IB) chemistry	• Taught IB chemistry and IGCSE chemistry to students from Singapore, India, Indonesia, and Greece since 2020 as a chemistry tutor. Classes included covering the syllabus, solving past question papers, and helping students with their 'chemistry Internal Assessment (IA)'. The IA is a compulsory research project.

PUBLICATIONS

Hartwig, J.F., Bhandari, S., Rablen, P.R. Addition of Catecholborane to Ruthenium-Alkyl Evidence for a σ-Bond Metathesis with a Low Valent, Late Transition Metal. *J. Am. Chem. Soc.,* **1994**, *116,* 1839-1844.

Bhandari, S., Mahon, M.F., McGinley, J.G., Molloy, K.C., Roper, C.E. Synthesis, characterization and reaction chemistry of organotin-substituted bis(thiotetrazoles)- supramolecular metallotetrazole structures containing hard and soft donors. *J. Chem. Soc., Dalton Trans*., **1998**, 3425-3430.

Bhandari, S., Mahon, M.F., Molloy, K.C. Synthesis and supramolecular architectures of tetrakis(triorganostannyltetrazoles), including the crystal structure of hydrated 1,2,4,5-tetrakis(triethylstannyltetrazolyl)benzene. *J. Chem. Soc., Dalton Trans.,* **1999**, 1951-1956.

Barret, M., Bhandari, S., Mahon, M.F., Molloy, K.C. The structure of triphenyl(1-phenyl-5-mercapto-1H-1,2,3,4-tetrazolato)lead(IV): towards the first example of a π-coordinated metallotetrazole? *J. Organomet. Chem*., **1999**, *587*, 101-103.

Bhandari, S., Frost, C.G., Hague, C.E. *et al.* Synthesis of functionalized (triorganostannyl)tetrazoles: supramolecular structures of n-[2-(triorganostannyl)tetrazol-5-yl]pyridine (n=2, 3 or 4). *J. Chem. Soc., Dalton Trans.*, **2000**, *5*, 663-669.

Bhandari, S., Mahon, M.F., Molloy, K.C. *et al.* Thallium(I)- and organothallium(III)-substituted mono-, bis- and tris-tetrazoles: synthesis and supramolecular structures. *J. Chem. Soc., Dalton Trans.*, **2000**, *7*, 1053-1060.

Hao, H., Bhandari, S., Ding, Y., Roesky, H.W., Magull, J., Schmidt, H-G., Noltemeyer, M., Cui, C. Pyrrolylaldiminato Complexes of Zn, Mg and Al. *Eur. J. Inorg. Chem.,* **2002**, 1060-1065.

Singh, A.K., Bhandari, S. Tin (II and IV) Complexes with Nitrogen Ligands: Review of Recent Developments*. Main Group Metal Chemistry*, **2003**, *26*, 155-211.

Wang, Y., Bhandari, S., Parkin, S., Atwood, D. A. Five coordinate organoaluminum acetylides and crystal structure of the hydrosylate [Salophen(t-Bu)Al]$_2$O. *J. Orgmet. Chem*., **2004**, *689*, 759-765.

Wang, Y., Bhandari, S., Mitra, A., Parkin, S., Moore, J., Atwood, D. A. Ambient-condition nano-alumina formation through molecular control. *Z. für Anorg. und Allg. Chem.*, **2005**, *631(13-14),* 2937-2941.

Bhandari, S., Jhadav, S. T., Kumar, S. Land Capability Classification and Crop Suitability Assessment in a Watershed Using RS and GIS – A Case Study of Watershed in Dehradun, Uttarakhand, *International Journal of Geo Science and Geo Informatics* , **2014**, *1(1)*, 1-15.

Bhandari, S. The Evolution of Environment Education in India. *International Journal of Humanities and Social Science*, **2016**, *3(1),* 43-52.

Bhandari, S. Caste System and Reproductive Behaviour of Termites. *Scientific India*, **2019**, *7(5)*, 28-31.

Bhandari S., Phulera, K., Shrivastava, T. Rainbow Experiment illustrating Acids and Bases. *Science Reporter,* **2023**, *60(05)*, 50-51.

BOOKS

Bhandari, S.; Malik, G.; Shankar, S. An Enchanting Trail through Wilderness- Insights into the Web of Life; Blurb Inc.: U.S.A., 2014.

Bhandari, S. Aqua Apocalypses; Amazon Inc.: U.S.A., 2018.

CONFERENCE PROCEEDINGS

Bhandari, S.; Jhadav, S.T.; Kumar, S. Paper ID UCP0032: Land Capability Classification and Crop Suitability Assessment in a Watershed Using RS and GIS – A Case Study of Watershed in Dehradun, Uttarakhand. Conference Proceedings of the 14th ESRI India User Conference 2013, New Delhi, December 2013.

Bhandari, S. Paper ID 955: Understanding Cognitive Profiles of Students in an Environmental Studies Course When Exposed to Various Non-Traditional Pedagogical Tools. Abstract accepted at EDULEARN14 (6th International Conference on Education and New Learning Technologies), Barcelona, Spain, 7th-9th July 2014.

Bhandari, S. Paper ID UCP0033: A Comparative Analysis between the Extreme Flood Events That Wreaked Havoc in Jammu and Kashmir in September 2014 and the Unusual Confluence of Monsoons that Triggered Mammoth-Scale Destruction in Uttarakhand in June 2013. Conference Proceedings of the 15th ESRI India User Conference 2014, New Delhi, December 2014.

Bhandari, S. Necessity of Revival of Traditional Knowledge Systems for Environmental Protection. Conference Proceedings of the National Conference on India's Scientific Wisdom: Emerging Worldview (ICISW-2016), Conference Hall, Haryana Bhawan, Copernicus Marg, New Delhi, India, February 27-28, 2016.

POSTERS PRESENTED

- Hartwig, JF, Bhandari, S. Rablen, P.R. (1994): 'Recent Results with Compounds Possessing Transition Metal-Boron Bonds'. Gordon Research Conference on Organometallic Chemistry, 1994, U.S.A.
- Bhandari, S, Molloy, KC, Mahon, MF. 'Organotin and Organolead Tetrazoles'. Royal Society of Chemistry Groups 13-15 Discussion Group, 1996, London, U.K.
- Bhandari, S, Molloy, KC, Mahon, MF. 'Organothallium Tetrazoles and Organotin Thio-Tetrazoles'. Royal Society of Chemistry Groups 13-15 Discussion Group, 1997, London, U.K.

- Bhandari, S, Molloy, KC, Mahon, MF. 'Organothallium Tetrazoles and Organotin Thio-Tetrazoles'. South-West Regional Dalton Conference, 1997, Bath, U.K.
- Upadhyay, RK, Bhandari, S, Roy, SS. 'Synthesis of Cu and CuO nanoparticles and their Applications as Photocatalysts for Water Treatment', Mapping the materials: Genome Conference, 2013, Shiv Nadar University, Dadri, India.
- Bhandari, S. *et al.*
  1. 'Agroforestry - an integrated approach of using the interactive benefits from combining trees and shrubs with crops and/or livestock'
  2. 'Biogeographic zones of India depending upon the biogeographic characteristics, geophysical influences, including climates, terrains, winds, ocean currents, soil types and vegetation'
  3. 'Harmful microorganisms for humans"
  4. 'Medicinal plants and their healing properties'
  5. 'Waste not, want not: converting agricultural biomass into energy'
  6. 'Winemaking or Vinification is the production of wine, starting with selection of the grapes or other produce and ending with bottling the finished wine'

  Open house on 'career pathways in Natural Sciences', 2013, Shiv Nadar University, Dadri, India.
- Kaskaoutis DG, Bhandari S, Sharma JK. Atmospheric, environmental, and socio-economic impacts of the dryness of ephemeral lakes*,* Open house on 'career pathways in Natural Sciences', 2013, Shiv Nadar University, Dadri, India.
- Bhandari S. 'Blended Learning: Employing exhibitions as a pedagogical tool to advance education and awareness', FICCI Higher Education Summit 2013, 2013, New Delhi, India.
- Bhandari S. 'Can history indeed provide solutions to current problems? - metal phosphide nanomaterials as corrosion-resistance agents', International Conference on Science and Engineering of Materials, 2014, Sharda University, Greater Noida, India.
- Bhandari S. 'The Wetlands of the Land of the Gods - Their Enthralling Beauty and Potential Geohazards', National Symposium on Annual Conventions on Recent Advances in Remote Sensing and GIS with Special Emphasis on Mountain Ecosystems & of Indian Society of Remote Sensing & Indian Society of Geomatics**,** 7th - 9th December 2016, Indian Institute of Remote Sensing, Dehradun.
- Bhandari S. 'Wetlands, a Threatened Eco legacy- a Case Study of Sundarbans of India and Bangladesh', Bio spectrum 2017, 25th-26th August 2017, University of Engineering and Management, Kolkata.
- Bhandari S. 'Spectroscopic Techniques used to Probe Transesterification Reactions', Conference on Advances in Catalysis for Energy and Environment CACEE-2018, 10th-12th January 2018, Tata Institute of Fundamental Research, Mumbai.

TRAINING COURSES

- One day workshop on 'Leading a Powerful, Loving and Effective life', Ranbaxy Research Laboratories, Gurugram, India, 1998.

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- One day workshop on 'Hazard and Operability studies', Ranbaxy Research Laboratories, Gurugram, India, 2nd December 1998.
- Two-month intensive course in German sponsored by Alexander von Humboldt Foundation in Goethe Institute, Göttingen, Germany, 1st June-31st July 2000.
- One day training course in 'Laboratory Safety' conducted at PI Industries Ltd., Udaipur, India, 26th February 2007.
- Two months training in 'Design, Construction and Operation of Kilo Labs/Pilot Plants', PI Industries Ltd., Udaipur, India, August-September 2007.
- Workshop on 'Curriculum Development And E-Learning' conducted by Professor N.J. Rao and Mr. Sivakumar at Sri Sivasubramaniya Nadar College of Engineering, Chennai, 14th-25th July 2011.
- NNMRS (National Natural Resources Management System) course on 'Remote Sensing (RS) and Geographic Information Software (GIS) Technology' sponsored by Indian Space Research Organization (ISRO) at Indian Institute of Remote Sensing (IIRS), Dehradun, May 6th-June 28th, 2013.
- Faculty Development Program on 'Effective Teaching in The Classroom', Shiv Nadar University, Stellar Gymkhana, Greater Noida, July 20th-26th, 2013.
- Pre-Workshop on 'Advanced Research Methodology and Statistical Analysis Using: PASW-22.0 (SPSS)', School of Management, Gautam Buddha University, Greater Noida, 11th to 17th May, 2015.
- Symposium tutorial on 'Watershed Management in Mountainous Landscape' conducted at IIRS, Dehradun, 5th-6th December, 2016.
- Faculty Development Program on 'Pedagogic and Personal Effectiveness Workshop', Shree Guru Gobind Singh Tricentenary University, Gurugram, 10th-12th January, 2017.
- Faculty Development Program on 'Multiple-Choice Questions and Item Analysis' conducted by Dr Arun Saxena at Shree Guru Gobind Singh Tricentenary University, Gurugram, 26th May, 2017.
- Faculty Development Program on 'Writing a Project Proposal' by Dr Suma GN at Shree Guru Gobind Singh Tricentenary University, Gurugram, 11th and 18th July, 2017.
- Faculty Development Program on 'Assessment techniques - Objective-type questions' conducted by Dr Tirth das Dogra at Shree Guru Gobind Singh Tricentenary University, Gurugram, 21st July, 2017.
- Faculty Development Program on 'Teaching methodology based on Cognitive Skills', Shree Guru Gobind Singh Tricentenary University, Gurugram, 2017-18.
  Some methodologies include student-interactive session (SIS), student seminars (SS), teacher seminars (multispecialty), project-based learning (PBL), problem-based learning (PBL), case studies, focus group discussion, spot group discussion, presentation cum panel discussion by teachers and students, fish bowel technique, role play, simulation technique/animation, tutorials, and integrated teaching (intra and inter faculty).

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- Faculty Development Program on 'Leadership style – Delegation versus Instruction, Direction versus Encouragement/Nurturing' at Shree Guru Gobind Singh Tricentenary University, Gurugram, July 2017.
- 'Roman Architecture' by Diane E.E. Kleiner, Open Yale Course (24 Lectures), May-June 2020.
- Fantasy Writer's Week by Pro Writing Aid, February 22-26, 2021.
- Romance Writer's Week by Pro Writing Aid, October 10 to 15, 2021.
- Online Training cum Workshop on 'Essential Oil, Perfumery, and Aromatherapy' organized by Fragrance and Flavour Development Centre, Ministry of Micro, Small and Medium Enterprises, Government of India, Kannauj- 209726, Uttar Pradesh, India, February 9 to 11, 2022.
- 'Principles of Evolution, Ecology, and Behaviour' by Stephen C. Stearns, Open Yale Course (24 Lectures), May-June 2022.

CONFERENCES/WORKSHOPS/SYMPOSIA ATTENDED

- South-West Regional Dalton Conference, Cardiff, U.K., 1995.
- Modern Trends in Inorganic Chemistry, Bangalore, India, 2000.
- Republic of Science: 50 Years, 'From Scientific Literacy to Scientific Research: The Indian Experience' by Prof. Jayant V. Narlikar (Director, Inter-University Centre for Astronomy & Astrophysics, Pune), India Habitat Centre, New Delhi, India, 1999.
- Seminar on 'Supramolecular Chemistry- Concepts and Perspectives' by Professor Jean-Marie Lehn of University of Strasbourg (France), Indian Institute of Technology Delhi, New Delhi, 10th January, 2000.
- Public Lecture on 'India 2020: A Vision for the New Millennium' by Honorable Professor APJ Abdul Kalam, Indian Institute of Technology Delhi, New Delhi, 2000.
- Introductory Meeting of the Alexander von Humboldt Foundation, Göttingen, Germany, 2000.
- Annual Meeting of the Alexander von Humboldt Foundation, Berlin, Germany, 2001.
- Leopoldina Symposium, 'Chemistry and Mathematics: The Two Languages of the 21st Centur*y*', Göttingen, Germany, 2001.
- Seminar on 'Principles of Process Development', PI Industries, Udaipur, India, 30th January, 2007.
- Seminar on 'Reductions in Organic Chemistry' by Professor KK Balasubramanian (Emeritus Professor, Indian Institute of Technology Chennai), PI Industries, Udaipur, India, 3rd February, 2007.
- Seminar on 'Chromatography with focus on Gas Chromatography (GC), Thin Layer Chromatography (TLC) and High-Performance Liquid Chromatography (HPLC)', PI Industries, Udaipur, India, 21st February, 2007.
- Seminar on 'Process Improvement for Cost Reduction', PI Industries, Udaipur, India, 24th February, 2007.
- Seminar on 'Challenges and Opportunities of Green Chemistry', PI Industries, Udaipur, India, 17th March, 2007.

- Seminar on 'Process Development from the viewpoint of Chemical Thermodynamics and Kinetics', PI Industries, Udaipur, India, 14th April, 2007 and 1st August, 2007.
- Seminar on 'Oxidations in Organic Chemistry' by Professor KK Balasubramanian (Emeritus Professor, Indian Institute of Technology Chennai), PI Industries, Udaipur, India, 2007.
- National Conference on 'Technologically Important Materials', Sharda University, Greater Noida, India, 21 May, 2010.
- Satellite Conference of International Congress of Mathematicians 2010 (ICM 2010) on 'Mathematics in Science and Technology- Mathematical methods, models and algorithms in science and technology', India Habitat Centre, New Delhi & India Islamic Cultural Centre, New Delhi, 15th - 17th August 2010.
- Workshop on 'Discover the Doctor Within & Experience the Miracle of Healing', SIGFA Solutions (Faridabad), Om Shanti Retreat Centre, Gurugram, Haryana, India, 13th-15th April, 2012.
- Awareness Raising and Information Campaign by The European Union, India Habitat Centre, New Delhi, India, 27-28th September, 2012
- India-Cambridge Summit, India in the Global Age, Taj Mahal Hotel, New Delhi, India, 10th September, 2012
- National Conference on the Call of Time, Towards Holistic Environmental Excellence, Vigyan Bhavan, New Delhi, India, 27-28th October, 2012
- TERI-Rockefeller International Workshop on 'Resilient Cities- Experience from Asian Cities Climate Change Resilient Network (ACCRN) in Asia & Beyond', Delhi Sustainable Summit, India Habitat Centre, New Delhi, India, 29th Jan, 2013
- National Conference on 'Mapping the Materials Genome', Shiv Nadar University, Dadri, India, March 8-10, 2013
- Dr. K. Kasturirangan, Former Chairman, ISRO and Member (Science), Planning Commission visited IIRS, Dehradun on 7th June 2013. He addressed the IIRS fraternity and was apprised about the training education and research activities of IIRS.
- Workshop on Earth Day 2013, Secretariat, Govt. of National Capital Territory (NCT) of Delhi, India Environment Society, Ministry of Earth Sciences, Government of India, New Delhi, India, 11th July, 2013.
- 1st International Workshop on 'Advanced Materials Challenges for Alternative Energy Solutions', Le Meridien, New Delhi, 15th-17th September, 2013. **(Invited Workshop)**
- Symposium on 'Emerging Research Trends in Sciences & Grantsmanship', Faculty Development Centre, Shiv Nadar University, Dadri, India, 21st September 2013.
- India Geospatial Forum, 16th Annual International Conference and Exhibition on 'Geospatial Information Technology & Applications', 5th-7th February, 2014, Hyderabad International Convention Centre, Hyderabad
- Fourth Digital Learning World Education Summit 2014, eLets Techno media Pvt. Ltd., 7th-8th August, 2014, Eros Hotel, Nehru Place, New Delhi.
- Global Cambridge: India, Development and Alumni Relations, Cambridge, 19th September, 2014, New Delhi.

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- Environmental Humanities and New Ecologies in the 21st Century, Collaboration of Shiv Nadar University, India and KTH Royal Institute of Technology, Sweden; Shiv Nadar University, 29th September, 2014.
- India International Science Festival, Indian Institute of Technology Delhi, 4-8th December, 2015.
- Consultation workshop on 'Availability of Clean Water and the Problem of Waste Water in Gurugram' organized by Transdisciplinary Research Cluster on Sustainability Studies, Jawaharlal Nehru University, Delhi held in Shama Tourist Complex, Gurugram, Haryana on 7th to 9th February, 2017.
- Science Circle Lecture on 'Revival of the Malthusian Threat? – The Importance of Innovation in Agriculture' by Prof. Dr. Johannes Sauer Head, Chair for Agricultural Production and Resource Economics at Technical University Munich, German House, 2 Nyaya Marg, Chanakyapuri, New Delhi**,** 3rd March 2017.
- Workshop on 'Wine Appreciation' organized by SULA Vineyards, Shree Guru Gobind Singh Tricentenary University, Gurugram, 23rd March, 2017.
- Public Lecture by Dr J.K. Chhabra, Ex Consultant Professor IIIT Allahabad, Ex Scientist F and Deputy Director, Photonics Group, Central Scientific Instruments Organization on "Fiber Optics", Shree Guru Gobind Singh Tricentenary University, Gurugram, 27th-28th March, 2017.
- Science Circle Lecture on Affordable Excellence - How frugal innovations can turn into an engine for growth in India and abroad by Dr. Stephan Buse and Dr. Rajnish Tiwari, Institute of Technology and Innovation Management (TIM) of Hamburg University of Technology (TUHH), German House, 2 Nyaya Marg, Chanakyapuri, New Delhi**,** 29th November 2017.
- India Policy Forum 2018 organized by NCAER (National Council of Applied and Economics Research), Imperial Hotel, New Delhi, 10th July, 2018.
- 'The Climate Music Project: Online Discussion', Earth Day, National Academy of Sciences, April 22, 2020.
- Gulf Research Program Webinar: Remembering the Deepwater Horizon Oil Spill with Marcia McNutt, April 28, 2020.
- 'Going to Polar Extremes: Flipping the switch on climate change' with paleontologist Kirk Johnson, Science and Entertainment Exchange, National Academy of Sciences, May 6, 2020.
- 'Back to our roots: contemporary extramural education ad midst a pandemic' by Dr. James Gazzard, Institute of Continuing Education Marketing, University of Cambridge, May 20, 2020.
- 'Kindness- Building a better chemistry culture', Chemistry World, Royal Society of Chemistry, May 21, 2020.
- 'Creativity in Business' by Dr. Alex Carter, Institute of Continuing Education Topical Talks, May 27, 2020.
- 'Facing an active 2020 hurricane season: Impacts of the Loop Current', National Academy of Science, Engineering and Medicine, Gulf Research Program, June 2, 2020.
- 'Biological Annihilation: Infectious Diseases as a threat to humanity' with Dr Tom Moore, Institute of Continuing Education, University of Cambridge, June 10, 2020.

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- 'Virtual Open Day', Institute of Continuing Education, University of Cambridge, June 12-13, 2020.
- 'Understanding Educational Inequality' with Dr Nigel Kettley, Institute of Continuing Education, University of Cambridge, June 17, 2020.
- 'Flexible Working- Building a Better Chemistry Culture', Chemistry World, Royal Society of Chemistry, June 18, 2020.
- Royal Society of Chemistry Conference Week: 'Supporting Chemistry Education- beyond lockdown', June 22-26, 2020.
- 'Coronavirus laid bare with Dr. Chris Smith, Institute of Continuing Education, University of Cambridge, June 24, 2020.
- 'Big data: seeing the world through the sensors' with Dr Oliver Hadeler, Institute of Continuing Education, University of Cambridge, July 1, 2020.
- Annual Meeting of the Inorganic Reactions Mechanisms Discussion Group held on July 7, 2020.
- 'What do we need to know?' with Dr Jane Gregory, Institute of Continuing Education, University of Cambridge, July 8, 2020.
- 'Creativity and Resilience' with Abigail Docherty', Institute of Continuing Education, University of Cambridge, July 15, 2020.
- 'Gretchen Rubin: Happiness in Times of Uncertainty', #50WomenAtYale150, Yale Women and Yale Alumni Association, July 21, 2020.
- 'Politics of the Painted Hall' with Dr Lydia Hamlett, Institute of Continuing Education, University of Cambridge, July 29, 2020.
- 'National Geographic Pristine Seas Expedition to Cape Horn', Yale Alumni Academy, July 30, 2020.
- 'Don't be scared of the novel: some suggestions to get you started' with Rupert Wallis, Institute of Continuing Education, University of Cambridge, August 5, 2020.
- 'Undergraduate Chemistry Education for a Sustainable Future: Green Chemistry Module Development', American Chemical Society Green Chemistry Institute, August 5, 2020.
- 'Conclave on Transformational Reforms in Higher Education under National Education Policy 2020', Ministry of Human resource Development (MHRD) and University Grants Commission (UGC), August 7, 2020.
- 'Internationalization in Higher Education: The Pandemic Changes Everything, The Pandemic Changes Nothing' by Dr. Mark Elliott, Vice Provost for International Relations, Harvard University, organized by the Association of Indian Universities and Education and Culture, US Embassy, New Delhi, August 7, 2020.
- 'Tackling Bullying and Harassment- Building a Better Chemistry Culture', Royal Society of Chemistry, August 13, 2020.
- 'Combating Vaccine Hesitancy: Today's Fight Against Misinformation with Chelsea Clinton', Clinton Global Initiative University, Clinton Foundation, August 13, 2020.
- 'Empowering Women in Organic Chemistry 2020', August 13 and 14, 2020.

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- The Novel, Now and Then with Dr Jenny Bavidge, Institute of Continuing Education, University of Cambridge, August 19, 2020.
- 'Genome Editing – A new dawn or a false hope?' with Dr Tom Monie, Institute of Continuing Education, University of Cambridge, August 26, 2020.
- 'C&En's Futures Festival', American Chemical Society, August 25 and 26, 2020.
- 'Virtual Celebration of 150 Years of Women at Yale', Yale Alumni Association, September 24-27, 2020.
- 'Reimagining Women, Peace and Security', Commonwealth Foundation, November 25, 2020.
- Fireside chat with Dr Nancy Messonnier, Director of the National Center for Immunization and Respiratory Diseases, moderated by National Geographic's Dr Nsikan Akpan, Aspen Institute Science & Society Program and LeapsMag, December 7, 2020.
- 'How a Crisis Can Help You Cultivate a Growth Mindset' with Susan J. Ashford, professor at the University of Michigan's Ross School of Business, Harvard Busines Review Webinar, December 7, 2020.
- *Critical Conversations* event 'A Commonwealth for All: Young Leaders Speak', Commonwealth Foundation, December 8, 2020.
- 'Wildfire Effects on Ecosystems, Farmworkers, Horses and Wine Grapes', Board on Agriculture and Natural Resources, The National Academies of Sciences, Engineering, and Medicine, Washington DC, U.S.A., December 8, 2020.
- 'Systems Thinking in Chemistry Education: Preparing Global Citizens for a Sustainable Future', American Chemical Society Green Chemistry Institute, December 11, 2020.
- A discussion with Jeffrey Archer on his new book, 'Hidden in Plain Sight', Nehru Centre, High Commission of India, London, U.K., December 17, 2020.
- Climate Expo: A Fusion of Science and Policy and advancing a Resilient, Zero-Carbon World, Organized by the COP26 Universities Network and 'Rete delle Universita' per lo sviluppo Sostenibile (Italian University Network for Sustainable Development), May 17-21, 2021.
- Climate Risk Summit, Organized by COP26 Universities Network, Cam Zero, and Imperial College London, September 29- October 1, 2021.
- Ocean-Climate Nexus, Organized by the Institute of Policy Research, University of Bath, October 14, 2021.
- Climate Change, Climate Solutions, and Climate Colonialism, Organized by Centre for Climate Repair at Cambridge (CCRC), October 18, 2021.
- The Role of Oceans in Tackling Climate Change, Organized by Centre for Climate Repair at Cambridge, October 19, 2021.
- Climate Repair for Whom? Voices on climate change needs and experiences from climate vulnerable regions, Organized by Centre for Climate Repair at Cambridge, October 19, 2021.
- An exclusive broadcast with Two Titans of Fiction - Bernard Cornwell and Jeffrey Archer, Organized by Waterstones, October 25, 2021.
- Yale & Slavery in a Historical Perspective - 23rd Annual Conference, Organized by Gilder Lehrman Centre for the Study of Slavery, Resistance, and Abolition, The Macmillan Centre at Yale University, New Haven CT, U.S.A., October 28-30, 2021.

- Natural and Prescribed Wildland Fire Impacts on Soil Health: Board on Earth Sciences and Resources (BESR) Fall 2021 Meeting, Organized by The National Academies of Sciences, Engineering, and Medicine, November 2, 2021.
- Biweekly seminars on various issues affecting the world during COVID, Good Society Forum, Maurice R. Greenberg World Fellows Program.
- Biweekly seminars on various aspects of 'creative writing' by Pro Writing Aid (Grammar guru, style editor and writing mentor).

LECTURES AND WORKSHOPS ORGANIZED

1. **Oral presentation** at the 14th ESRI India User Conference 2013, December 2013: Land Capability Classification and Crop Suitability Assessment in a Watershed Using RS and GIS – A Case Study of Watershed in Dehradun, Uttarakhand.
2. **Keynote/Invited** lecture at the National Conference on "Earth and environmental: Pollution and Prevention", January 2014: Exhibitions as a Pedagogical Tool to Advance Education and Awareness.
   Organized by: Amity University in association with Ministry of Earth Sciences, New Delhi
3. **Oral presentation** at the National Conference on "Environmental Constraints, Conservation and Resource Development of Medicinal Plants for Health and Societal Benefits", 21st-23rd March, 2014, Doon University, Dehradun: Batliwalas of Udaipur's Traditional Knowledge in Treating Hair Ailments Using a Mix of Herbs with Henna (*Lawsonia inermis*)
4. **Oral presentation** at the National seminar on "Environment, Natural Resources and Sustainable Development"- India-EU Project on Enhancing Quality, Access and Governance of Undergraduate Education in India, 8th-9th April, 2014, University of Hyderabad, Hyderabad: E-learning tools used in teaching in Shiv Nadar University**.**
5. **Invited Lecture** at the Geo Research Forum in the Department of Geography, Delhi School of Economics, University of Delhi, Delhi-7, 11th July, 2014: Unusual Confluence of Monsoons Triggers Mammoth-scale destruction in Kedarnath Valley and Downstream along the Mandakini**.**
6. **Invited Lecture** at the International Symposium on Conservation and Management of Pollinators for Sustainable Agriculture and Ecosystem Services, National Agricultural Science Complex, Pusa, New Delhi, September 24-26, 2014: Recollections from a field trip to the Yamuna Biodiversity Park, Wazirabad.
7. **Oral presentation** at the 15th ESRI India User Conference 2014, December 2014: A Comparative Analysis Between the Extreme Flood Events That Wreaked Havoc in Jammu and Kashmir in September, 2014 and the Unusual Confluence of Monsoons That Triggered Mammoth-Scale Destruction in Uttarakhand in June, 2013.
8. **Research Presentation at Faculty Development Program of SGT Core Research Committee** on **'**Research Facilities and Achievements' in the Faculty of Physical Sciences, Shree Guru Gobind Singh Tricentenary University, February 2017.
9. **'Master of Ceremony' at the Guest lecture** by Dr. Vepa Kameswara Rao, DRDE (Defence Research and Development Establishment), Gwalior on "Fundamentals and Applications of Biosensors", Shree Guru Gobind Singh Tricentenary University, 15th March 2017.

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10. **Invited talk** on 'Course Development and Assessment' as Faculty Development Program, Faculty of Physical Sciences, Shree Guru Gobind Singh Tricentenary University, July 2017.
11. **Organized Faculty of Physical Sciences Induction Program for 2017-2018 students,** 1st August-5th August 2017.
12. **Invited talk** on 'Andragogy – classroom, problem, activity, and project-based learning, group and panel discussion, case studies, student interactive session, seminars, assignments and presentations, role playing, simulations *etc.'* in Induction Program, Faculty of Physical Sciences, Shree Guru Gobind Singh Tricentenary University, 2nd August 2017.
13. **Bridge course** offered in chemistry for freshmen B.Tech., B.Sc., and B. Pharm. Students, August 2017.
14. **Organized Orientation Program**, Faculty of Physical Sciences, Shree Guru Gobind Singh Tricentenary University, Gurugram, India, 15th September, 2017.
15. **Organized Faculty Development Program,** "Teaching Skills: Effective Communication" by Dr. Nudrat Jahan, Assistant Professor at Shree Guru Gobind Singh Tricentenary University, 16th December, 2017. Faculty of Physical Sciences, Shree Guru Gobind Singh Tricentenary University, Gurugram, India.
16. **Invited talk** on 'Vision 2030- Future of Chemistry', Foundation Day, 24th January 2018. Faculty of Physical Sciences, Shree Guru Gobind Singh Tricentenary University, Gurugram, India.
17. **Organized Guest Lecture,** "Green Chemistry- Designing Chemistry for Environment and Human Health" by Professor Rakesh K. Sharma of the Department of Chemistry, University of Delhi, 27th April 2018, Faculty of Physical Sciences, Shree Guru Gobind Singh Tricentenary University, Gurugram, India.
18. **Invited as Judge** at the 'Farewell Function' of the outgoing B.Sc. and M.Sc. classes of 2018 for Miss and Mr Farewell, May 2018, Shree Guru Gobind Singh Tricentenary University, Gurugram, India.
19. **Oral Presentation** at the National Conference in "Beating the Plastic Hazard: Challenges and Strategies", 4th June 2018, Department of Environmental Engineering, Delhi Technological University and Green Institute for Research & Development: Impact of Plastics on the Marine Environment

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EDITORIAL BOARD MEMBER

1. Appointed to the editorial board of **Universal Journal of Educational Research** (Horizon Research Publishing) from 05/27/2014 to 05/26/2017.
2. Appointed to the editorial board of **Scientific Society of Advanced Research and Social Change**

PROFESSIONAL AFFILIATIONS

- Member of American Chemical Society, 1992-1994, 2002-2005
- Member of the Alexander von Humboldt Club, U.S.A, 2002-till date.
- Life Member of Oxford and Cambridge Society of India.
- Life Member of Association of British Scholars, New Delhi.

- Life member of Journal of Indian Remote Sensing Society (Membership no. L-4182), Dehradun.
- Life member of National Book Trust, India
- Fellow Member to the Scientific Society of Advanced Research and Social Change, 2013
- Member of Society for Medicinal Plant and Natural Product Research (Gesellschaft für Arzneipflanzen- und Naturstoff-Forschung e.V.), 2014.

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