

# SHUBHAM SEWARIYA

Commonwealth Research Scholar (under Ph.D. programme)  
School of Pharmacy & Biomedical Sciences  
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CSIR-Senior Research Fellow (under Ph.D. programme)  
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## CAREER OBJECTIVE:

From the lens of a prospective translational chemist, my research interest(s) orbit around drug discovery and development. Being passionate and committed towards research, my long-term objective is to develop novel and potent therapeutic drug leads for betterment of human health. I aspire to carry out fruitful and qualitative research at the interface of interdisciplinary science. I strongly feel that a blend of synthetic organic, biological, analytical, and computational chemistry is the perfect recipe for well-being of mankind.

## ACADEMIC QUALIFICATION:

S.No.	Course	University/Institute	Year(s)/Duration	Division	Subject(s)
1.	<b>**Ph.D.</b> (Doctorate of Philosophy)	University of Delhi	<b>March 2020 – Till date</b>	-	Medicinal Chemistry, Drug discovery & development
2.	<b>*Integrated BS-MS</b> (Integrated Bachelor of Science and Master of Science)	IISER Thiruvananthapuram	2013 - 2018	1 <sup>st</sup>	Chemistry
3.	<b>All India Senior School Certificate Examination</b>	Silver Bells High Secondary School (CBSE)	2012	1 <sup>st</sup>	Chemistry, Physics & Mathematics

\*\* Title of PhD thesis: "Synthesis and biological evaluation of novel natural alkaloid noscaphine analogues"

\* Title of MS thesis: "DNA templated self-assembly of Diaminopurine-Pyrene dyad"

## RESEARCH EXPERIENCE:

### DECEMBER 2023 – TILL DATE

Commonwealth Split-site Scholar (under Ph.D. programme)  
School of Pharmacy and Biomedical Sciences  
University of Central Lancashire  
Preston – PR12HE, United Kingdom

**Title: "Targeted dereplication of antibacterial metabolites in microbial extracts for enhanced bioactivity against multidrug resistant pathogenic strains"**

## **AUGUST 2021 – TILL DATE**

CSIR- Senior Research Fellow (SRF) (under Ph.D. programme)  
Drug Discovery & Development Laboratory  
Department of Chemistry,  
University of Delhi, Delhi – 110007, India

**Title: “Synthesis and biological evaluation of novel natural alkaloid noscapine analogues”**

## **AUGUST 2019 – JULY 2021**

CSIR- Junior Research Fellow (JRF) (under Ph.D. programme)  
Drug Discovery & Development Laboratory  
Department of Chemistry,  
University of Delhi, Delhi – 110007, India

**Title: “Synthesis of biologically active Pyrazinoindoles and its mechanistic interaction”**

## **MAY 2017 – APRIL 2018**

INSPIRE – SHE Research Fellow (Integrated BS-MS)  
School of Chemistry,  
Indian Institute of Science Education and Research Thiruvananthapuram  
Thiruvananthapuram, Kerala – 695551, India

**Title: “DNA templated self-assembly of Diaminopurine-Pyrene dyad”**

## **APRIL 2016 – APRIL 2017**

INSPIRE – SHE Research Fellow (Integrated BS-MS)  
School of Biology,  
Indian Institute of Science Education and Research Thiruvananthapuram  
Thiruvananthapuram, Kerala – 695551, India

**Title: “Pipeline for Next generation sequencing data analysis”**

## **RESEARCH EXPERIENCE:**

**Duration** August 2019 – Till date (*Ph.D. Programme*)

**Supervisor** Prof. Shrikant Kukreti, Senior Professor, Department of Chemistry, University of Delhi.

**Co-guide** Prof. Ramesh Chandra, Senior Professor, Department of Chemistry, University of Delhi.

**Title** **Synthesis and biological evaluation of novel natural alkaloid noscapine analogs.**

The diverse library of organic compounds is composed of a major portion of heterocyclic compounds. Nature provides us with a variety of products consisting of a N-heterocycle motif which are the elementary structural units of marketed drugs in the present era. One of such N-heterocyclic promising building block which has gained attraction of chemists is noscapine and the inflating interest in this moiety is a result of the fused heterocyclic ring structure. Fused-polycyclic structural core is necessary to synthesize multi-functional drugs. In the literature, noscapine exhibits numerous reports of their biological activities and therapeutic uses particularly as anticancer, antifungal, antibacterial, antidepressants. This study attempts to highlight synthetic approaches and therapeutic applications of noscapine-based scaffolds using ionic-liquid approach along with Palladium catalysed cross-coupling chemistry.

**Title** **Synthesis of biologically active Pyrazinoindoles and its mechanistic interaction**

We have identified a simple route to generate enantiomerically pure Pyrazinoindoles from chiral amines, aryl aldehydes and HFIP that plays dual role under the reaction. A one-pot, highly enantioselective Pictet-Spengler reaction was used to direct the synthesis under

microwave-assisted approach. A plausible mechanism for role of HFIP as a solvent and catalyst has also been discussed. Along with this, we investigated their *in vitro* activity against various antibacterial strains as well. Some of the derivatives were found to have potent activity against pathogenic bacteria used in the study namely *Staphylococcus aureus*, and *Escherichia Coli*, *Acinetobacter baumani* and *Bacillus subtilis*; it inferred that presence of bromo and bulky group improved antibacterial activity.

**Duration** May 2017 - April 2018 (*Major thesis in chemistry, Integrated BS-MS Programme*)

**Supervisor** Prof. Mahesh Hariharan, Professor, School of Chemistry, IISER Thiruvananthapuram.

**Title** DNA templated self-assembly of Diaminopurine-Pyrene dyad.

In this study, we aimed to synthesize a 2,6-diaminopurine-pyrene conjugate denoted as DAP-P to study its assembly on a single stranded dT<sub>18</sub> oligomer. To this end, we were able to complete the organic synthesis and perform basic computational studies. The synthesis of TEG functionalized DAP-P allows us to have a robust and reproducible DNA-templated DAP-P assembly in water/buffer medium. Also, computational studies were done to understand this architecture better which can be crucial to gain knowledge in behaviour of pi-stacked chromophores, pH and temperature dependence of self-assembly, effects of self-assembly and stacking on fluorescence etc. These insights can help in designing better light-harvesting systems, improved probes for biological studies, and in designing next-generation DNA memory storage devices.

**Duration** August 2016 - April 2017 (*Minor thesis in biology, Integrated BS-MS Programme*)

**Supervisor** Dr. Nishant K.T., Associate Professor, School of Biology, IISER Thiruvananthapuram.

**Title** Pipeline for Next generation sequencing data analysis.

All NGS platforms perform sequencing of millions of small fragments of DNA in parallel and bioinformatics analyses are used to piece together these fragments. The development of NGS methods has led to the increase in sequencing speed but analysis of NGS data set is a huge challenge in terms of time, and computational skills. In this project, a Graphical user interface (GUI) was created with Java as the front end and Shell Script as the back end. The GUI created in this work will help to reduce the long and repetitive command line operations which are to be performed during the NGS data analysis. In addition to that, it also helps in inspection of the quality of the sample data. The GUI is created specifically for DNA-Sequencing.

**Duration** May 2015 – July 2015 (*Research Internship*)

**Supervisor** Prof. Mahesh Hariharan, Professor, School of Chemistry, IISER Thiruvananthapuram.

**Title** Effect of distance on lifetime of charge separated states in carbon donor and acceptor chromophores.

In this project, we were able to synthesize the linked carbon donor and acceptor chromophores, the donor being pyrene and the acceptor being aceanthrylene. to study the effect of distance on lifetime of charge separated states by increasing conjugation between the donor and acceptor. The synthesized chromophores were 2-(pyren-1-yl)aceanthrylene, 2-(4-(pyren-1-yl)phenyl)aceanthrylene (with one benzene linker between donor and acceptor chromophore, 2-(4'-(pyren-1-yl)-[1,1'-biphenyl]-4yl)aceanthrylene with two benzene linkers between the carbon chromophore.

## LABORATORY AND EXPERIMENTAL SKILLS:

- Reactions** Advanced Organic synthesis: Multistep organic synthesis, multi-component reaction, Microwave assisted synthesis, Cross-coupling reactions, Handling moisture-sensitive reagents and reactions.
- Instruments** Liquid chromatograph mass spectrometer (LCMS), NMR spectrometer, NIR UV spectrophotometer, Fluorescence spectrophotometer etc.
- Computational** ACD/Labs, Gaussian, Mestre nova, JEOL NMR, Chemdraw, Olex2, Hex 8.0 (Analytical softwares); ORIGIN, MS excel (Graphing softwares); Mac, Windows and LINUX (Operating systems); Shell scripting, LATEX, MS Office
- Others** Thin layer chromatography, Column chromatography, Identification and analysis of compounds by using analytical and spectral techniques i.e., NMR, IR, HRMS, UV-Vis, etc. Writing research projects, research papers, scientific reports etc.

## FELLOWSHIPS AND ACHIEVEMENTS:

### 2023-2024 Commonwealth Split-site PhD scholarship 2023

Awarded by the Commonwealth Scholarship Commission and funded by UK Foreign, Commonwealth & Development Office (FCDO) to conduct research on the topic entitled "Targeted dereplication of antibacterial metabolites in microbial extracts for enhanced bioactivity against multidrug resistant pathogenic strains" under the supervision of Dr. Jioji Tabudravu, School of Pharmacy and Biomedical Sciences, University of Central Lancashire, Preston – PR12HE, United Kingdom.

### 2023 ACS Student communities professional meeting grant

Awarded by American Chemical Society (ACS) to present research entitled "Synthesis, in-vitro, in-silico and biophysical evaluation of noscapine and 9-bromo noscapine ionic liquid: A comparative analysis" at ACS Fall 2023 to be held in San Francisco, California, USA during 13 – 17<sup>th</sup> August, 2023.

### 2023 CSIR Travel Grant

Awarded by Council of Scientific and Industrial Research (CSIR) to present research entitled "Synthesis, in-vitro, in-silico and biophysical evaluation of noscapine and 9-bromo noscapine ionic liquid: A comparative analysis" at ACS Fall 2023 to be held in San Francisco, California, USA during 13 – 17<sup>th</sup> August, 2023.

### 2022 ACS Student communities professional meeting grant

Awarded by American Chemical Society (ACS) to present research entitled "Synthesis and in-silico evaluation of novel Suzuki-coupled noscapine ionic liquids" at ACS Fall 2022 held in Chicago, Illinois, USA during 21 – 25<sup>th</sup> August, 2022.

### 2021-Till date Senior Research fellowship

Awarded by Council of Scientific and Industrial Research (CSIR), Govt. of India to carry out research on the topic entitled "Synthesis and biological evaluation of novel natural alkaloid noscapine analogues" under the supervision of Prof. Ramesh Chandra, University of Delhi, Delhi – 110007, India.

### 2019 - 2021 Junior Research fellowship

Awarded by Council of Scientific and Industrial Research (CSIR), Govt. of India to carry out research on "Synthesis of biologically active Pyrazinoindoles and its mechanistic interaction"

along with synthesis of other novel N-heterocyclic motifs under the supervision of Prof. Ramesh Chandra, University of Delhi, Delhi – 110007, India.

#### **2019-2024 National fellowship (NFSC)**

Awarded by University Grants Commission, Govt. of India upon clearing UGC-NET exam to undertake advanced studies and research leading to M.Phil./Ph.D. degrees in sciences.

#### **2013-2018 INSPIRE – SHE (Scholarship for Higher Education) fellowship**

Awarded by Department of Science and Technology, Govt. of India under the Innovation in Science Pursuit for Inspired Research (INSPIRE) programme during Integrated BS-MS at IISER Thiruvananthapuram, Kerala – 695551, India.

**2019** Qualified Graduate Aptitude Test in Engineering examination with 5411 All India rank.

**2017** Qualified CSIR-NET for JRF and Lectureship examination with 120 All India rank.

**2013** Qualified JEE-Advanced examination with 2715 All India rank.

#### **PAPERS IN PRESS/COMMUNICATED:**

1. Yadav, S.#; **Sewariya, S. #**; Raman, A. P.#; Singh P.\*; Chandra, R.; Kumari K.\* **(2024)** “Examine the spectroscopic, electrochemical, and computational methods for the binding of Thifluzamide to Hemoglobin” (*under review in International Journal of Biological Macromolecules*)
2. **Sewariya, S.**; Singh, S.; Roy, I.; Konakov, A.A.; Aggarwal, R.; Chandra, R. **(2024)** “Fluorescence bioimaging in second near infrared window: A review on history, development and future prospects” (*communicated in ACS applied nanomaterials*)

#### **RESEARCH PUBLICATIONS IN PEER-REVIEWED JOURNALS:**

1. Yadav, S.#; **Sewariya, S. #**; Singh, M. B.#; Sachdeva, B.; Singh. P.\*; Chandra, R.; Kukreti, S.; Singh, S. K.; Kumari, K.\* **(2024)** “Employing Spectroscopic, Electrochemical, and *In Silico* Research to Investigate the Interaction of Ofloxacin, Antibacterial Drug with the Haemoglobin”, *Chemistry Select*, 9, e202400770. DOI: [10.1002/slct.202400770](https://doi.org/10.1002/slct.202400770)
2. **Sewariya, S.**; Sehrawat, H.; Mishra, N.; Singh, M. B.; Singh, P.; Kukreti, S.; Chandra R.\* **(2023)** “Comparative assessment of noscapine and 9-bromo noscapine ionic liquid: Synthesis, *in-vitro* studies plus computational & biophysical evaluation with human haemoglobin”, *International Journal of Biological Macromolecules*, 247, 125791. DOI: [10.1016/j.ijbiomac.2023.125791](https://doi.org/10.1016/j.ijbiomac.2023.125791)
3. Yadav, S.; **Sewariya, S.**; Chandra, R.; Singh, P.\*; Kumar, A.; Jain, P.; Sachdeva, S.; Kumari K.\* **(2023)** “An investigation to understand the correlation between the experimental and density functional theory calculations of noscapine”, *Journal of Physical Organic Chemistry*, 36(7), e4502. DOI: [10.1002/poc.4502](https://doi.org/10.1002/poc.4502)
4. **Sewariya, S.**; Singh, S.; Rana, N.; Kumar, Y.; Chandra, R.\*; Anderson, E.\* **(2023)** “Englerin, a naturally occurring sesquiterpene diester: Isolation, Synthesis and Biological relevance”, *European Journal of Medicinal Chemistry reports*, 7, 100101. DOI: [10.1016/j.ejmcr.2023.100101](https://doi.org/10.1016/j.ejmcr.2023.100101)

5. Singh, A.; Kumar, N.; Singh, S.; **Sewariya, S.**; Sharma, M.; Chandra, R.\* (2021) "High-valued Pyrazinoindole analogues: Synthesis, Antibacterial Activity, Structure Activity Relationship and Molecular Dynamics Analyses", *Results in Chemistry*, 3, 100194. DOI: [10.1016/j.rechem.2021.100194](https://doi.org/10.1016/j.rechem.2021.100194)
6. Singh, A.; Singh, S.; **Sewariya, S.**; Singh, N.; Singh, P.; Kumar, A.; Bandichhor, R.; Chandra, R.\* (2021) "Stereoselective N-acylation of Indoles and corresponding Microwave mediated synthesis of Pyrazinoindoles using HFIP", *Tetrahedron*, 84, 132017. DOI: [10.1016/j.tet.2021.132017](https://doi.org/10.1016/j.tet.2021.132017)
7. Singh, A.#; Mahapatra, S.#; **Sewariya, S.**; Singh, N.; Singh, S.; Kumar, Y.; Bandichhor, R.; Chandra, R.\* (2021) "A Mini-Review on the synthesis of Pyrazinoindole: Recent Progress and Perspectives", *Mini Reviews in Organic Chemistry* 18(4), 504-514. DOI: [10.2174/1570193X17999200806151209](https://doi.org/10.2174/1570193X17999200806151209)
8. Singh, N.; Singh, S.; **Sewariya, S.**; Singh, A.; Rathee, G.; Sood, D.; Chandra, R.\* (2019) "Noscapine as Anticancer Agent and Its role in Ovarian Cancer", *Organic & Medicinal Chemistry International Journal*, 9(2), 555757. DOI: [10.19080/OMCIJ.2019.09.555757](https://doi.org/10.19080/OMCIJ.2019.09.555757)

*Note:* #Equal authorship and \*Corresponding author(s)

## ABSTRACT/PAPER PRESENTED IN CONFERENCES/SCIENTIFIC MEETINGS:

1. **Sewariya, S.**; Sehrawat, H.; Mishra, N.; Singh, M.; Singh, P.; Kukreti, S.; Chandra R. (2024) "Synthesis, in-vitro, in-silico, and biophysical evaluation of noscapine and 9-bromo noscapine ionic liquid: A comparative analysis" at PABS 3<sup>rd</sup> annual research conference, organized by School of Pharmacy and Biomedical Sciences, University of Central Lancashire, Preston, United Kingdom held on 20<sup>th</sup> March, 2024 (**Awarded Best poster**)
2. **Sewariya, S.**; Sehrawat, H.; Mishra, N.; Singh, M.; Singh, P.; Kukreti, S.; Chandra R. (2024) "Noscapine against 9-bromo noscapine ionic liquid as a potent anticancer agent: A comparative study" at International Conference on Chemical and Biological Sciences (ICCBS-2024), organized by Atma Ram Sanatan Dharma College, University of Delhi, Delhi, India held on 27 – 29<sup>th</sup> January, 2024.
3. **Sewariya, S.**; Sehrawat, H.; Mishra, N.; Singh, M.; Singh, P.; Kukreti, S.; Chandra R. (2023) "Comparative assessment of noscapine and 9-bromo noscapine ionic liquid: Synthesis, in-vitro studies plus computational & biophysical evaluation with human haemoglobin" at ACS Fall 2023, organized by American Chemical Society (ACS) at San Francisco, California, USA held on 13 – 17<sup>th</sup> August, 2023.
4. **Sewariya, S.**; Sehrawat, H.; Chaudhary, S.; Chandra, R. (2022) "Synthesis and in-silico evaluation of novel Suzuki-coupled noscapine ionic liquids" at ACS Fall 2022, organized by American Chemical Society (ACS) at Chicago, Illinois, USA held on 21 – 25<sup>th</sup> August, 2022.
5. **Sewariya, S.**; Sehrawat, H.; Yadav S.; Sharma, P.; Chandra R. (2022) "Synthesis, in-silico and biophysical evaluation of 9-substituted Suzuki-coupled noscapine ionic liquids" at Recent Advances in Nano Medical Sciences (RANMS - 2022), organized by Institute of Nano Medical Sciences (INMS) and Institution of Eminence (IoE), University of Delhi, Delhi, India held on 22 – 23<sup>rd</sup> June, 2022.
6. **Sewariya, S.**; Sehrawat, H.; Chaudhary, S.; Chandra R. (2022) "Development of novel Suzuki-coupled noscapine ionic liquids: *in-silico* evaluation, synthesis and biophysical studies" at 2<sup>nd</sup> Indian Analytical Congress (IAC - 2022) jointly organized on Graphic Era University, Dehradun, Indian Society of Analytical Scientists (ISAS) – Delhi Chapter and CSIR – Indian Institute of Petroleum, Dehradun, India held on 26-28<sup>th</sup> May, 2022.

7. **Sewariya, S.;** Kumar, Y.; Singh, A.; Yadav, S.; Chandra R. **(2020)** “Microwave-assisted development of Pyrazinoindoles via Pictet-Spengler reaction” at Third International conference on Emerging Synergistic trends in Ayurvedic and Biomedical Sciences organized by Bundelkhand University, India held on 19-20<sup>th</sup> February, 2020. **(Awarded Best poster)**

## **CONFERENCES & SYPOSIUMS ATTENDED/ORGANIZED:**

- 2024 **PABS 3<sup>rd</sup> annual research conference**, organized by School of Pharmacy and Biomedical Sciences, University of Central Lancashire, Preston, United Kingdom held on 20<sup>th</sup> March, 2024.
- 2024 **International Conference on Chemical and Biological Sciences (ICCBS-2024)**, organized by Atma Ram Sanatan Dharma College, University of Delhi, Delhi, India held on 27 – 29<sup>th</sup> January, 2024.
- 2023 **ACS Fall 2023: Harnessing the power of data**, organized by American Chemical Society at San Francisco, California, USA held on 13 – 17<sup>th</sup> August, 2023.
- 2022 **ACS Fall 2022: Sustainability in a changing world**, organized by American Chemical Society at Chicago, Illinois, USA held on 21 – 25<sup>th</sup> August, 2022.
- 2022 **Recent Advances in Nano Medical Sciences (RANMS - 2022)**, organized by Institute of Nano Medical Sciences (INMS) and Institution of Eminence (IoE), University of Delhi, Delhi, India held on 22 – 23<sup>rd</sup> June, 2022.
- 2022 **2<sup>nd</sup> Indian Analytical Congress (IAC - 2022)**, organized on Graphic Era University, Dehradun, Indian Society of Analytical Scientists (ISAS) – Delhi Chapter and CSIR – Indian Institute of Petroleum, Dehradun, India held on 26 - 28<sup>th</sup> May, 2022.
- 2021 **Antibodies and Vaccines as drugs for COVID-19** (e-symposium), organized by Keystone symposia, Colorado, USA held on 13 – 14<sup>th</sup> January, 2021.
- 2020 **Asthma: New discoveries and therapies in the age of COVID** (e-symposium), organized by Keystone symposia, Colorado, USA held on 1 – 2<sup>nd</sup> December, 2020.
- 2018 **Photoinduced Processes in Nucleic Acids and Proteins: Faraday Discussion**, organized by Royal Society of Chemistry (RSC) and IISER Thiruvananthapuram, India held on 11 – 13<sup>th</sup> January, 2018.
- 2017 **NANOBIOTECK, Second Annual Conference of Indian Society of Nanomedicine (ISNM)**, organized by IISER Thiruvananthapuram and AIIMS, India held on 26 – 30<sup>th</sup> October, 2017.
- 2016 **Fourth International Conference on Nanomedicine and Tissue Engineering (ICNT)**, organized by International and Interuniversity Centre for Nanoscience and Nanotechnology (IIUCNN), MG University, Kottayam, Kerala, Wuhan University, China and Nicholas Copernicus University, Poland held on 12 – 14<sup>th</sup> August, 2016.

## **PERSONAL DETAILS:**

**Date of Birth** 26<sup>th</sup> June 1994

**Nationality** Indian

**Gender** Male

**Languages** English (fluent), Hindi (native)

**Permanent Address** C-25, Yashoda Residency, Ohadpur, City Centre, Gwalior – 474011, M.P. (INDIA)

## REFERENCES:

- 1. Professor Ramesh Chandra**, *FRSC* London  
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## DECLARATION:

I declare that the information given above is true to the best of my knowledge and belief and nothing has been hidden.



**SHUBHAM SEWARIYA**