SIMRAN DHINGRA

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TL;DR

With a strong focus on cancer therapeutics, I am currently pursuing Ph.D. at Louisiana State University, proficient in organic synthesis, HPLC analysis, and advanced spectroscopy. My research projects involve creating novel bioconjugates for targeted cancer treatment and dual HIV therapy. This has led to multiple research publications and awards. In addition, I have dedicated two years to mentoring undergraduates, sharing my knowledge and experience, and thereby motivating them to pursue chemistry as their career. I am also actively engaged in various community outreach initiatives, aiming to make a positive impact beyond the academic sphere.

EDUCATION

Louisiana State University (LSU) *2019 - Present*
PhD Student
Department of Chemistry
Under Prof. Graca Vicente

Panjab University, Chandigarh *2016 - 2018*
M.Sc. (Hons.) Chemistry
1^{st} division with distinction.

Panjab University, Chandigarh *2013 - 2016*
B.Sc. (Hons.) Chemistry
1^{st} division with distinction.

AREAS OF INTEREST

- Organic Chemistry; specifically, design, synthesis, and characterization of Small Molecule Inhibitors
- Targeted Cancer Therapeutics
- Bioconjugate Chemistry
- Analytical Chemistry, Materials Science

SKILLS

- Multi-step Organic Synthesis
- HPLC Analysis
- UV-Visible Spectroscopy
- Infrared Spectroscopy
- ESI-TOF and MALDI Mass Spectrometry
- 1D and 2D NMR Spectroscopy
- Cell Viability Assays
- Fluorescence Emission Analysis

RESEARCH PROJECTS

BODIPY- TKI Bioconjugates for specific targeting of EGFR. Aug 2021 - Jan 2023
Louisiana State University *Prof. Graça Vicente*

- Boron dipyrromethene (BODIPY) dyes are well-known for their excellent photophysical properties that have led to their successful applications in fluorescence imaging and chemical sensing. Tyrosine kinase inhibitors (TKIs) are well-known for their ability to specifically bind the intracellular kinase domain of Epidermal Growth Factor Receptor (EGFR).

- The combination of these two agents in a single conjugate allows for diagnosis of cancer cells that overexpress EGFR.

Design, synthesis and characterisation of Aza-BODIPY-TKI-peptide bioconjugates. Ongoing Project
Louisiana State University *Prof. Graça Vicente*

- Aza-dipyrromethene boron difluoride or aza-BODIPYs have shown 90nm red shift in both absorption and emission wavelengths in the near- infrared region as compared to their BODIPY analogues. Thus, making these aza-BODIPYs, a very important class of fluorophores for early detection of cells that overexpress EGFR. These aza-BODIPYs can be conjugated to various other biomolecules like TKIs and peptides that show high affinity towards the EGFR.
- The combination of these three agents in a single conjugate is expected to enhance diagnosis and treatment of cancer cells that overexpress EGFR.

Chlorin e_6-nevirapine Conjugates for dual HIV and PDT treatments. Ongoing Project
Louisiana State University *Prof. Graça Vicente and Prof. Vincent Licata.*

- Chlorins, especially chlorin e_6 derivatives, are well-known photosensitizers for the photodynamic treatment (PDT) of tumors and inactivation of viruses because of their ability to generate singlet oxygen and other reactive oxygen species upon light activation. Nevirapine is a well-known and widely used therapeutic drug for the treatment and prevention of Human Immunodeficiency Virus (HIV-1).
- The combination of these two agents in a single conjugate is hypothesized to be an efficient dual PDT-HIV photosensitizer.

Synthesis and study of Crystal structure properties of various nitroquinoline derivatives Jan 2018 - May 2018
Panjab University, India *Dr. Deepak B Salunke and Dr. Subhash Chandra Sahoo*

- Several studies focus on the synthesis and pharmacological evaluations of nitroquinoline analogues but lack evaluation of the crystalline structure of these molecules.
- In my research, new chemical entities with 3-nitroquinoline framework were synthesized by installing a different amine at C-4 of the 3-nitroquinoline moiety and their novel crystal structure properties were thoroughly investigated.

Design and Synthesis of Imidazoquinoline derivatives as novel human Toll-Like Receptor (TLR)-7/8 modulators Jan 2016 - May 2018
Panjab University, India *Dr. Deepak B Salunke and Prof. S.K Mehta*

- In this research I developed a new synthetic route to 1-benzyl-2-butyl-1H- imidazo[4,5-c]quinoline-4- amine, an extremely potent Toll-Like receptor-7 (TLR7) agonist, with the aim to improve the synthetic yield and reduce the overall cost of its synthesis, allowing for extensive exploration of its biological activity.

PUBLICATIONS

- **Simran Dhingra**, Prajesh Shrestha, Arpan Chowdhury, Zehua Zhou, Seetharama D. Jois, and Maria da Graça H. Vicente, *"The Synthesis of BODIPY-TKI Conjugates and Investigation of Their Ability to Target the Epidermal Growth Factor Receptor"*, Targets 2023, 1(1), 48-62..

- Ndung'u, Caroline, Daniel J. LaMaster, **Simran Dhingra**, Nathan H. Mitchell, Petia Bobadova-Parvanova, Frank R. Fronczek, Noémie Elgrishi, and Maria da Graça H. Vicente., *"A Comparison of the Photophysical, Electrochemical and Cytotoxic Properties of meso-(2-, 3- and 4-Pyridyl)-BODIPYs and Their Derivatives"*, Sensors 2022, 22(14), 5121..

- N. E. M. Kaufman, **Simran Dhingra**, S. D. Jois, and M. G. H. Vicente, *"Molecular Targeting of Epidermal Growth Factor Receptor (EGFR) and Vascular Endothelial Growth Factor Receptor (VEGFR)"*, Molecules 2021, 26, 1076..

- Deepender Kaushik, **Simran Dhingra**, Madhuri T. Patil, Sakshi Piplani, Varun Khanna, Yoshikazu Honda-Okubo, Lei Li, Johnson Fung, Isaac G. Sakala, Deepak B. Salunke and; Nikolai Petrovsky, *"BBIQ, a pure TLR7 agonist, is an effective influenza vaccine adjuvant"*, Hum. Vaccines Immunother. 2020, 16(8), 1989-1996..

IN REVIEW

- N. E. M. Kaufman, M. Wang, G. Zhang, C. Ndung'U, **Simran Dhingra**, K. M. Smith and M. G. H. Vicente, *"Biologically Relevant Amines and their Derivatives"*, Current Organic Chemistry.

FELLOWSHIPS AND AWARDS

- Graduate Research Symposium Fellowship from Division of Organic Chemistry of American Chemical Society (ACS), July 2023.

- 2023 Advancing Science Conference Grant from 50^{th} Annual NOBCChE Conference, September 2023.

- Recipient of Eleanor Earle Memorial Scholarship by American Association of University Women (AAUW), June 2023.

CONFERENCES AND WORKSHOPS

- *Project: Synthesis of BODIPY-TKI conjugates and investigation of their ability for targeting the Epidermal Growth Factor Receptor*
  - Presenting a poster at the **Center for Pre-Clinical Cancer Research** symposium organised by LSU School of Veterinary Medicine on October 27, 2023.
  - Delivered a talk at the 50^{th} **Annual NOBCChE Conference**, September 2023.
  - Presented a poster at the **ACS Division of Organic Chemistry Graduate Research Symposium** at Montana State University, July 2023.
  - Delivered a talk at **Graduate Research Conference** held at Louisiana State University in April 2023.
  - Presented a poster at the 2022 **ACS Southwest Regional Meeting (SWRM)** in November 2022.

- *Project: Synthesis of Toll-Like Receptor 7/8 Agonistic Imidazoquinolines*
  - Presented a poster at the **ACS premier outreach program** at the Indian Institute of Science Education and Research (IISER), Mohali in February 2018.
  - Presented a poster at the medicinal chemistry conference **MEDCHEM-2017** at the Indian Institute of Technology (IIT), Madras in November 2017.

- Participated in the **Indo-UK scoping workshop** on *"Development of Rural Biorefineries in India"* at Department of SAIF/CIL, Panjab University in February 2017.

- Participated in **Professor R.C. Paul National Symposium on Current Advances in Chemical Sciences** in February 2017.

· Presented a poster entitled *"Biomimicry and Green Chemistry for sustainability"* at the 11^{th} Chandigarh Science Congress, **CHASCON-2017** in March 2017.

· Participated in the workshop *"Transition metals in organic synthesis"* by Prof. Roderick W. Bates, NTU, Singapore under the **GIAN** Programme by Govt. Of India during June-July 2017.

TEACHING ASSISTANTSHIPS

CHEM 4564 (Advanced Organic Chemistry Laboratory) Fall 2023
Louisiana State University *Dr. Fedra Leonik*

CHEM 2364-14 (Organic Chemistry Laboratory) Spring 2023
Louisiana State University *Dr. Tamara Nauman*

CHEM 2364-07 (Organic Chemistry Laboratory) Fall 2022
Louisiana State University *Dr. Alfonso Davila*

CHEM 2463 (Organic Chemistry Laboratory Honors) Spring 2022
Louisiana State University *Dr. Rendy Kartika*

CHEM 2364-13 (Organic Chemistry Laboratory) Spring 2021
Louisiana State University *Dr. Tamara Nauman*

CHEM 2364-10 (Organic Chemistry Laboratory) Fall 2020
Louisiana State University *Dr. Tamara Nauman*

CHEM 2364-10 (Organic Chemistry Laboratory) Spring 2020
Louisiana State University *Dr. Tamara Nauman*

CHEM 1212-3 (General Chemistry Laboratory) Fall 2019
Louisiana State University *Dr. Caroline Schneider*

ACADEMIC ACHIEVEMENTS

· Nominated to present at the ACS Division of Organic Chemistry Graduate Research Symposium at Montana State University, July 2023.

· Contributed in designing a course (CHEM 4564) with Dr. Fedra Leonik for chemistry majors, Summer 2023.

· Participated in 3-minute research elevator pitch competition held by NOBCChE at Louisiana State University on February 27^{th}, 2022.

· Winner, among 40 competing teams, in the intradepartmental quiz "CHEM MINDS" at the Panjab University, during 2013-2014.

· Represented the Chemistry Department of Panjab University in the Interdepartmental Quiz Competition during the 8^{th} Chandigarh Science Congress, CHASCON-2014 in February 2014.

EXTRA-CIRRUCULAR

· Volunteered for community outreach with Elaine Education Foundation at LaSalle Elementary School, Baton Rouge, in October 2023. Activities included teaching kids how to build molecules using marshmallows and toothpicks.

- Contributed to the Chemistry Demonstration (ChemDemo) Program for Girls' Day at the LSU Museum of Natural Science on March 4^{th}, 2023. Activities included demonstrating children what various objects, including sand, sugar, leaves, and fabrics, look like under a Scope-On-A-Rope microscope.

- Served as the advisor of the LSU Indian Students Association (LSU-ISA) for the 2022-2023 term. Activities included helping out the new committee members in organizing various cultural events and obtaining appropriate funding for the said events.

- Served as the Vice-President of LSU-ISA for the 2021-2022 term. Activities included managing the committee and organizing various cultural events.

- Achieved runner-up status in badminton mixed doubles and women's singles during the LSU-ISA event in Spring 2021.

- Hosted a ChemDemo program for 10^{th}- and 11^{th}-grade students at West St. John High School, Edgard, Louisiana, in September 2019. Activities included demonstrating two chemistry experiments: 1. light-producing chemical reactions, where students witnessed how elements come together to display various colors and 2. synthesizing a polymer, Silly Putty, using Elmers school glue and water-borax solution.

- Earned first place in the inter-department Rangoli competition at the "RASAYAN" fest organized by the Department of Chemistry at Panjab University, Chandigarh, in 2014.

- Secured the championship title in women's doubles at the "Badminton Championship" organized by the Indian Chemical Society in 2016-2017.

- Successfully completed a non-credit course on "Skill Development" organized by the Central Placement Cell, Panjab University, Chandigarh, in January 2017, receiving an A grade among 400 students from various university departments.

- Acted as a member of the Cultural Committee of the Indian Chemical Society at Panjab University during the 2017-2018 term.

REFERENCES

- **Prof. Graça Vicente (Primary Contact)**
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  Professor of Chemistry
  Louisiana State University
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  LSU Foundation James C. Bolton
  Distinguished Professor of Chemistry
  Louisiana State University
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