

## **GAURAV BHARGAVA, Ph.D.**

Assistant Professor (Chemistry)  
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### **Education:**

**Ph.D. (Organic Chemistry):** Guru Nanak Dev University, Amritsar, India, August, **2007**

Thesis: **“Some Synthetic Transformations of Dienyl- $\beta$ -lactams and 5-Dienyl Pyrimidinones”**  
Advisor: Prof. M. P. Mahajan

**M.Sc. (Chemistry):** Guru Nanak Dev University, Amritsar, India, **1998 - 2000**

**B.Sc. (Chemistry):** Guru Nanak Dev University, Amritsar, India, **1995 – 1998**

Cleared **National Eligibility Test (NET)-2000**; (NET is eligibility condition for lectureship at University/College level in India)

### **Experience:**

**May, 2010 – Now**      **Assistant Professor (Chemistry)**  
Punjab Technical University,  
Jalandhar - Kapurthala Highway  
Kapurthala (Punjab) - 144601

**April, 2009 – May 2010**    **Research Scientist**  
Chem-Master International Inc.; State University of New York; **Stony Brook, NY-11794, USA**

Highlights:

- Multi-step organic synthesis of medicinal compounds for drug discovery.
- Heterocyclic ring systems such as Imidazo-pyrazines, Imidazo-triazines, Aza-indoles, Pyrazoles, Pyrrolo-pyridines, Pyrimidines, Purines, Indoles, Pyridines, benzimidazoles, benzothiazoles, etc.
- Palladium cross coupling reactions such as Suzuki, Suzuki-Miyaura, Stille, Sonogashira, Heck reactions.
- Optimization and scale up from milligram to multi-gram level for industrial set-up using environmental friendly and economical synthesis.
- Draft, review and analyze scientific reports and other regulatory documents.

## Postdoctoral Research Associate:

September 2007 – December 2008

**Postdoctoral Research Associate in transition metal complexes catalysed multicomponent cycloaddition reactions**

**University of Santiago de Compostela, Santiago de Compostela, Spain**

Advisor: Professor Jose Luis Mascareñas

## Teaching Experience:

- **2004 to April, 2007** Lecturer, Department of Applied Chemistry, Guru Nanak Dev University, Amritsar, India
- **July 2001 to Feb 2004** Lecturer, D.A. V. College Amritsar Punjab

## Extra Academic activities:

Member Board of studies in Chemistry, PTU

Member Board of studies in Chemical Engineering, PTU

## Project sanctioned:-

Sr. No.	Title of the project	Sanction No.	Total Cost	Agency	Role
1.	Transition metal catalysed inter-/intramolecular cycloaddition reactions of methylene-& vinylcyclopropanes: Synthesis of bi-/tricyclic systems	2013/37c/11/BRNS/0395	23 lakh	BRNS, INDIA	PI
2.	Synthesis, cydoaddition, biological evaluation and synthetic transformations of mono-/polycyclic- <i>b</i> -lactams	Letter no CS-101/2012	23 Lakh	DST, INDIA	PI

## Publications:

1. T. S. Lobana, **Gaurav Bhargava**, Vinay Sharma and Manoj Kumar "Thiosemicarbazones of Silver(I): synthesis, spectroscopy and reactivity towards Triphenylphosphine" *Ind. J. Chem*, **2003**, 42A, 309-312.
2. **Gaurav Bhargava**, Mohinder P. Mahajan, Takao Saito, Takashi Otani, Mai Kurashima and Ken Sakai "Highly Diastereoselective and Remarkably  $\pi$ -Facially Selective Lewis

Acid-Catalysed Diels–Alder Cycloaddition Reactions: Access to Novel 1, 3, 4-Trisubstituted 2-Azetidinones” *Eur. J. Org. Chem.* **2005**, 2397–2405.

3. Vipin Kumar, **Gaurav Bhargava**, Promita D. Dey and M. P. Mahajan “A Convenient Route to Biologically Important Quinazolines Using N-Arylamino-1, 3-Diazabuta-1, 3-Dienes” *Synthesis*, **2005**, 3059-3062.
4. Pravesh Singh, **Gaurav Bhargava** and M. P. Mahajan “Tandem [2+2] cycloaddition and Cope rearrangement in cycloaddition reactions of cross-conjugated azatrienes with conjugated ketenes: a novel and facile synthesis of azocinone derivatives.” *Tetrahedron*, **2006**, 62, 11267–11273
5. Chander Mohan, **Gaurav Bhargava**, A. P. S. Pannu and Mohinder P. Mahajan “An unprecedented methylene oxidation accompanying the aza Diels-Alder reactions of acyclic unactivated alkenes: Synthesis of novel Quinolin-3-one substituted pyrimidinone derivatives” *Tetrahedron Letters* **2007**, 48, 1711–1713.
6. **Gaurav Bhargava**, Vipin Kumar and Mohinder P. Mahajan “Lewis acid promoted aza Diels-Alder reactions of acyclic unactivated 5-dienyl pyrimidinones with N-arylimines: synthesis of novel quinoline derivatives” *Tetrahedron Letters*, **2007**, 48, 2365-2368
7. Amit Anand, **Gaurav Bhargava**, M S Hundal and Mohinder P. Mahajan “A facile sodium alkoxide mediated ring opening of unactivated  $\alpha$ -dienyl- $\beta$ -lactams: synthesis of unnatural multicomponent  $\beta$ -aminodienoic esters” *Heterocycles*, **2007**, 73, 689 – 698
8. **Gaurav Bhargava**, Chander Mohan and Mohinder P. Mahajan “Lewis Acid promoted Imino Diels-Alder reactions of 5-dienyl pyrimidinones with N-aryl/naphthyl imines: Synthesis of novel quinoline/benzoquinoline derivatives” *Tetrahedron*, **2008**, 64, 3017-3024.
9. **Gaurav Bhargava**, Takao Saito and Mohinder P. Mahajan “Regio- and chemoselective unprecedented imino DA reactions of 1-substituted unactivated Dienes with N-Aryl Imines-Part-II” *Syn Lett*, **2008**, 98.
10. **Gaurav Bhargava**, Amit Anand, Mohinder. P. Mahajan, Takao Saito, Ken Sakai and Chitrani Medhi “Regio- and  $\pi$ -facial selective Lewis Acid interceded Diels-Alder reactions of  $\alpha$ -Dienyl- $\beta$ -Lactams: An indepth analysis” *Tetrahedron*, **2008**, 64, 6801.
11. Munish Mittal, Rajesh K Goel, **Gaurav Bhargava** and Mohinder P Mahajan “PASS Assisted Exploration of Antidepressant Activity of Novel 1,3,4- Trisubstituted- $\beta$ -Lactam Derivatives” *Bioorganic and Medicinal Chemistry Letters*, **2008**, 18, 5347-5349.
12. Amit Anand, **Gaurav Bhargava**, Pardeep Singh and Mohinder P. Mahajan “Regioselective nitroso Diels-Alder cycloaddition reactions of 5-dienyl pyrimidinone derivatives and their transformation to 4-amino alcohol tethered pyrimidinones” *Heterocycles*, **2009**, 77, 547-556.

13. Rakesh Kumar Mahajan, Rajiv Kumar Puri, **Gaurav Bhargava**, Mohinder Pal Mahajan “1,3,4-Trisubstituted-2-Azetidinone Derivatives As Novel Receptors For Bismuth(III) Ion-Selective Electrodes: Application In Pharmaceutical And Glass Samples” *Analytical letters*, **2009** Pages 2444 – 2459.
14. **Gaurav Bhargava**, Chander Mohan, P.M.S. Bedi and Mohinder P. Mahajan “Thieno [3,2-*d*] pyrimidin-4-one Derivatives as Potential Antibacterial Agents” Chander Mohan, Gaurav Bhargava and Preet M.S. Bedi *J Life Sci*, **2009**, 1(2), 97-101
15. **Gaurav Bhargava**, Beatriz Trillo, Fernando Lopez, Luis Castedo and Jose L. Mascarenas Palladium-Catalyzed [3+2+2] Cycloaddition of Alkylidenecyclopropanes. Efficient Construction of 5-7-5 fused Tricyclic Structures, *Chem. Commun.*, **2010**, 46, 270 - 272,
16. Chander Mohan , **Gaurva Bhargava** and Mohinder P. Mahajan “Chemo-selective IDA reactions: Synthesis of functionalized novel quinolin-3-one and quinoline derivatives” *Heterocycles*, **2010**, 80, 379
17. Amit Anand, **Gaurav Bhargava**, Vipin Kumar and Mohinder P. Mahajan, “A regio and diastereoselective transformation of 3-dienyl-2-azetidinones to novel pyrroloxazine” *Tetrahedron Letters*, **2010**, 51, 2312-2315
18. Pardeep singh, **Gaurav Bhargava**, Mohinder P. Mahajan A convenient route for the synthesis of octahydroisoquinolone derivatives using lactam synthon methodology, *Tetrahedron Letters*, **2010**, 51, 4272-4274.
19. Lucía Saya, **Gaurav Bhargava**, Miguel A. Navarro, Moises Gulías, Fernando López, Israel Fernández, Luis Castedo and José L. Mascareñas, “Nickel-catalyzed [3+2+2] cycloadditions between alkynylidenecyclopropanes and activated alkenes, *Angew. Chem. Int. ed.*, **2010**, 49 (51), 9886–9890,
20. P. M. S. Bedi, **Gaurav Bhargava**, Antibacterial activity of some novel tetrasubstituted pyrimidinones derivatives, *International Journal of Pharmacy and Pharmaceutical Sciences* 2, **2010**, 128-131
21. Raghu Raj, Vishu Mehra, Pardeep Singh, Vipin Kumar, **Gaurav Bhargava**, Mohinder P. Mahajan, Sachin Handa, LeGrande M. Slaughter,”  $\beta$ -Lactam-Synthon-Interceded, Facile, One-Pot, Diastereoselective Synthesis of Functionalized Tetra/Octahydroisoquinolone Derivatives *European Journal of Organic Chemistry*, **2011**, 2697–2704,
22. Amit Anand, **Gaurav Bhargava**, Vipin Kumar, Parvesh Singh, Krishna Bisetty and Mohinder P. Mahajan, “Regio- and diastereoselective nitroso Diels-Alder cycloaddition reactions of 3-dienyl-2-azetidinones with nitrosoarenes” *Letters in Org Chem.*; **2012**, 9,(6), 411

23. Pardeep singh, Raghu Raj, **Gaurav Bhargava\***, Denver T. Hendricks, Sachin Handa, LeGrande M. Slaughter, Vipin Kumar\*, " $\beta$ -lactam-synthon-Interceded Diastereoselective Synthesis of Highly Functionalized Octahydroindole Based Molecular Scaffolds and their invitro Cytotoxic Evaluation, *European Journal of Medicinal Chemistry*, **2012**, 513
24. Nisha, Kewal Kumar, **Gaurav Bhargava**, Kirkwood M. Land, Kai-Hsiang Chang, Reena Arora, Somdutta Sen, Vipin Kumar "*N*-propargylated isatin-Mannich mono- and bis- adducts: Synthesis and preliminary analysis of *in vitro* activity against the *Tritrichomonas foetus*" *Eur. J. Med. Chem*, **2014**, 74, 657 - 663
25. Yogesh Kumar, Bilash Kuila, Dinesh Mahajan, Balaram Mohapatra, Prabhpreet Singh and **Gaurav Bhargava\*** "Metal Free Diastereoselective Synthesis of Diaza-bicyclo[3.2.0]heptan-7-one and its Transformation to Functionalized proline esters" *Tett Lett* **2014**, 55, 2793-2795
26. Prabhpreet Singh, Lalit Singh Mittal, Sandeep Kumar, **Gaurav Bhargava**, Subodh Kumar "Perylene Diimide Appended with 8-Hydroxyquinoline for Ratiometric Detection of Cu(2+) Ions and Metal Displacement Driven "Turn on" Cyanide Sensing" *Journal of Fluorescence* **2014**, 24 (3): 909-15
27. Marisel Araya, Moisés Gulías, Israel Fernández, **Gaurav Bhargava**, Luis Castedo, José Luis Mascareñas, and Fernando López"Rhodium-catalyzed Intramolecular (3 + 2 + 2) Cycloadditions between Alkylidenecyclopropanes, Alkynes and Alkenes" *Chemistry: A European Journal*, **2014**, 20(33), 10255–10259
28. Prabhpreet Singh, Lalit Singh Mittal, Vanita Vanita, Rahul Kumar, **Gaurav Bhargava**, Amandeep Walia, and Subodh Kumar, 'Bay functionalized perylenediimide as a deaggregation based intracellular fluorescent probe for perchlorate" *Chemical Communications* **2014**, 50(90), 13994-13997
29. Yogesh Kumar, Prabhpreet Singh and **Gaurav Bhargava\*** "Diastereo- and Facially Selective Imino-Diels–Alder Cycloaddition of 2-Azeditinone-Tethered 1-Azadiene: Synthesis of Functional-ized 2-Oxo-4-(-styryl)azetid(3-yl)–Pyridine Hybrids" *Synlett*, **2015**, 26 (03), 363-366
30. Bilash Kuila, Prabhpreet Singh, Dinesh Mahajan, **Gaurav Bhargava\***, Nickel Catalysed (3+2) cycloaddition reactions of methylene cyclopropane with substituted cyclic alkenes *Tett lett*, **2015**, 56 (11), 1307-1311
31. Prabhpreet Singh, Harminder Singh, **Gaurav Bhargava**, Subodh Kumar, Triple-signaling mechanisms-based three-in-one multi-channel chemosensor for discriminating Cu<sup>2+</sup>, acetate and ion pair mimicking AND, NOR, INH and IMP logic functions, *Journal of Material Chemistry C*, **2015**, 3 (21), 5524-5532
32. Deepak Bains, Yogesh Kumar, Prabhpreet Singh, **Gaurav Bhargava**, [2+2] Cycloaddition Reactions of Butadienyl Ketene with 1,4-Diazabuta-1,3-dienes: Synthesis

- of Functionalized Butadienyl-4-iminomethyl-azetidin-2-ones and Butenylidene-butadienyl-[2,2'-biazetidine]-4,4'-diones *Journal of Heterocyclic Chemistry*, **2015**, (in Press)
33. Priyanka Sharma, Maninderjeet Kaur Mann, Bilash Kuila, Prabhpreet Singh, **Gaurav Bhargava**, Tandem Aza-Michael and Intramolecular Amidic Ring-Opening Reactions of  $\beta$ -Lactams: A Facile Synthesis of 4-Oxo-4, 5-dihydro-1H-pyrroles from  $\beta$ -Lactam Synthons, *Synlett*, **2016**, DOI :- [10.1055/s-0035-1560826](https://doi.org/10.1055/s-0035-1560826)
  34. Prabhpreet Singh, Kapil Kumar, **Gaurav Bhargava** and Subodh Kumar Self-assembled Nano rods of Bay functionalized perylene diimide: Cu<sup>2+</sup> based 'turn on' response for INH, complementary NOR/OR and TRANSFER logic functions and fluorosolvatochromism, *Journal of Materials Chemistry C*, **2016**, 4(13), 2488-2497, DOI: [10.1039/C6TC00422A](https://doi.org/10.1039/C6TC00422A)
  35. Prabhpreet Singh, Lalit Singh Mittal, Vanita Vanita, Rahul Kumar, **Gaurav Bhargava**, Amandeep Walia, and Subodh Kumar Self-assembled vesicle and rod-like aggregates of functionalized perylene diimide: Reaction based near-IR intracellular fluorescent probe for selective detection of palladium, *J. Mater. Chem. B*, **2016**, 4, 3750--3759
  36. Bilash Kuila, Yogesh Kumar, Dinesh Mahajan, Kapil Kumar, Prabhpreet Singh, **Gaurav Bhargava**, "A Facile and Chemoselective Synthesis of 1,4-Benzodiazepin-2-ones and Dienyl Thiazolidin-4-ones", *RSC Advances*, **2016**, 6, 57485 - 57489
  37. Yogesh Kumar, Prabhpreet Singh, **Gaurav Bhargava**, "Cu(I) mediated Kinugasa Reactions of  $\alpha,\beta$ -unsaturated Nitrones: A Facile, Diastereoselective Route to 3-(Hydroxy/bromo)methyl-1-aryl-4-(-styryl)azetidin-2-ones" *New Journal of Chemistry*, **2016**, (Accepted)
  38. Yogesh Kumar, Bilash Kuila Prabhpreet Singh and **Gaurav Bhargava**, "Highly Chemo and Diastereoselective Synthesis of Diaza-bicyclo[3.2.0]heptan-7-ones, Pyrrolidines and Aziridinopyrrolidine" *Arkivoc*, **2016**, (Accepted)
  39. Yogesh Kumar, Prabhpreet Singh, **Gaurav Bhargava**, Recent developments in fused  $\beta$ -lactams", *RSC Advances*, **2016**, (submitted)
  40. Maninderjeet kaur, Bilash Kuila, Prabhpreet Singh and Gaurav Bhargava "Transition Metal Catalysed [3+2+2] Cycloaddition Reactions, *Advanced Synthesis and Catalysis*, **2016**, (Submitted)
  41. Bilash Kuila, Prabhpreet Singh, Dinesh Mahajan, **Gaurav Bhargava**, Nickel(0) Catalysed selective di or trimerization of isocyanates, (Submitted)

## Books / Chapter Contributed

1. **Gaurav Bhargava**, Chander Mohan and Mohinder P. Mahajan Contributed one subchapters to ***Comprehensive Heterocyclic Chemistry***, A.R. Katritzky, Eds.; Pergamon; **2008** "Bicyclic 6-6 systems with one ring junction nitrogen atom: Three extra hetero atoms" 2:1.