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Other Information

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Research Excellence

Feb 2022–Present. Research Fellow
Advisor: Dr. Conor Evans, ☯ https://biophysics.fas.harvard.edu/people/conor-l-evans
Institute: Massachusetts General Hospital, Harvard Medical School, USA

July 2019–Jan 2022. Research Associate
Advisor: Prof. Ljiljana Fruk, ☯ www.fruk-lab.com
Institute: Dept of Chemical Engineering and Biotechnology, University of Cambridge, UK

Feb 2018–July 2019. Postdoc Fellow
Advisor: Prof. Dr. Rainer Haag, ☯ www.polytree.de
Institute: Institute for Chemistry and Biochemistry, Freie Universität Berlin, Germany

Academic Excellence

Jan 2012–Jan 2018. PhD, Organic and Polymer Chemistry
Thesis title: *Chemo-enzymatic Synthesis of Polymeric and Dendritic Architectures for Biomedical Applications & Synthesis of Biologically Potent Heterocyclic Compounds*
Advisor: Professor Sunil K. Sharma
Institute: Department of Chemistry, University of Delhi, Delhi 110007, India

Oct 2016–Mar 2017. Erasmus Exchange
Advisor: Professor Dr. Rainer Haag, ☯ www.polytree.de
Institute: Institute for Chemistry and Biochemistry, Freie Universität Berlin, Germany

Apr 2009–Mar 2011. Master of Science (MSc), Chemistry
Institute: Department of Chemistry, Kurukshetra University, Kurukshetra 136119, India

Apr 2006–Mar 2009. Bachelor of Science (BSc), Physics, Chemistry, and Mathematics
Institute: Kurukshetra University, Kurukshetra, India

Awards/Scholarship

- **ERASMUS+** fellowship to pursue research for six months (Oct 2016 to Mar 2017) in Freie Universität Berlin, Germany.
- **CSIR-JRF** (June 2012, All India Rank 54) awarded by Council of Scientific & Industrial Research (CSIR).
- **GATE**-Graduate Aptitude Test in Engineering (Feb 2011, All India Rank 486).

Publications (* marks corresponding author, # marks equal contribution)

1. International Patent

1. International Patent Application No. - PCT/US2023/083210
   Title: **Corneal Filler**
   Date of Filing – December 8, 2023, Date of Publication – NA
   Inventors – X. Li, C.L. Evans, R. Birngruber, R.R. Anderson, **B. Parshad**, L. Buhl, and G. Apiou
   Applicant – The General Hospital Corporation, MGH 2022-147-03

2. Research papers (* marks corresponding author, # marks equal contribution)

1. **B. Parshad**, A.G. Baker, I. Ahmed, A. Estepa-Fernández, D. Muñoz Espín, L. Fruk. Galactose-modified amphiphilic micelles for drug delivery to senescent cells. Small **2024** (submitted, ID: smll.202405732, minor revision)
2. Krishna, S. Syeda, **B Parshad**, J. Dhankhar, A. Sharma, A. Shrivastava, S.K. Sharma. Stimuli-Responsive Azo-Functionalized Non-Ionic Amphiphiles for Controlled Drug Delivery Applications. *Eur. Polym. J.* **2024**, *213*, 113127.
3. Y. Pan, L. Yu, L. Liu, J. Zhang, S. Liang, **B. Parshad** et al. Genetically Engineered Nanomodulators Elicit Potent Immunity against Cancer Stem Cells by Checkpoint Blockade and Hypoxia Relief. *Bioactive Materials* **2024**, *38*, 31-44.
4. P. Kumari, S. Arora, Y. Pan, I. Ahmed, S. Kumar, **B. Parshad**.* Tailoring Indocyanine Green J-Aggregates for Imaging, Cancer Phototherapy, and Drug Delivery: A Review. ACS Appl. Bio Mater. **2024**, *7*, 5121-5135.
5. B. Mohan, R. Kadiyan, S. Kumar, V. Gupta, **B. Parshad**, A.A. Solovev, A.J.L. Pombeiro, K. Kumar, P.K. Sharma. Carbon dioxide capturing activities of porous metal-organic frameworks (MOFs). *Microporous and Mesoporous Materials* **2024**, *366*, 112932.
6. **B. Parshad**, M. Stadtmueller, M. Baumgardt, K. Ludwig, C. Nie et al. Dual action heteromultivalent glycopolymer stringently block and arrest influenza A virus infection in vitro and ex vivo. *Nano Letters* **2023,** *23*, 4844-4853.
7. **B. Parshad**,# N. Hanheiser, T.L. Povoltsky, V. Khatri, K. Achazi, S. Bhatia. Synthesis and comparison of linear polymannosides for direct binding with Escherichia coli. *Macromol. Chem. Phys.* **2023**, 2300339.
8. S. Arora, R. Nagpal, M. Gusain, B. Singh, Y. Pan, D. Yadav, I. Ahmed, V. Kumar, **B. Parshad**.* Organic-inorganic Porphyrinoid Frameworks for Biomolecules Sensing. *ACS Sensors* **2023**, 8, 443-464.

9. P. Yadav, **B. Parshad**, Krishna, A. Sharma, R. Kakkar, S.K. Sharma. Triazole-based C3-symmetric multivalent dendritic architecture as Cu(II) ion sensor. *Indian J. Chem. Technol.* **2023**, 30, 111-116.
10. V. Khatri, **B. Parshad**, A.K. Prasad, S. Bhatia. Designs, synthesis, and biomedical applications of glycotripods for targeting trimeric lectins. *Eur. J. Org. Chem.* **2023,** e202201360.
11. A.B. Popov, F. Melle, E. Linnane, C. González-López, I. Ahmed, **B. Parshad** *et al.* Size-adjustable and Immunocompatible Polymer Nanocarriers for Drug Delivery in Pancreatic Cancer. *Nanoscale* **2022**, 14, 6656-6669.
12. Y. Pan, S. Zhou, C. Liu, X. Ma, J. Xing, **B. Parshad** *et al.* Dendritic polyglycerol-conjugated gold nanostars for metabolism inhibition and targeted photothermal therapy in breast cancer stem cells. *Advanced Healthcare Materials* **2022**, 2102272.
13. S. Kumar, B. Saroha, G. Kumar, E. Lathwal, S. Kumar, **B. Parshad** *et al.* Recent developments in nanocatalyzed green synthesis protocols of biologically potent diversed O-heterocycles – A review. *Catalysts* **2022**, 12, 657.
14. **B. Parshad**, M. Kumari, V. Khatri, R. Rajeshwari, Y. Pan *et al.* Enzymatic synthesis of glycerol, azido-glycerol and azido-triglycerol based amphiphilic copolymers and their relevance as nanocarriers: a review. *Eur. Polym. J.* **2021**, *158*, 110690.
15. M. Stadtmueller, S. Bhatia, P. Kiran, M. Hilsch, V. Reiter-Scherer, A. Lutz, **B. Parshad** *et al.* Evaluation of Multivalent Sialylated Polyglycerols for Resistance and Broad Antiviral Activity against Influenza Viruses. *J. Med. Chem.* **2021**, *64*, 12774-12789.
16. Y. Pan, S. Zhou, Y. Li, **B. Parshad**, W. Li, R. Haag. Novel dendritic polyglycerol-conjugated, mesoporous silica-based targeting nanocarriers for co-delivery of doxorubicin and tariquidar to overcome multidrug resistance in breast cancer stem cells. *J. Control. Rel.* **2021***, 330,* 1106*.*
17. A. Mittal, Krishna, Aarti, S. Prasad, P.K. Sharma, S.K. Sharma, **B. Parshad**.* Self-assembly of carbohydrate-based small amphiphiles and their applications in pathogen inhibition and drug delivery: A review. *Materials advances* **2021**, *2*, 3459-3473.
18. Y. Pan, S. Zhou, X. Ma, C. Liu, J. Xing, **B. Parshad** *et al.* Retinoic acid loaded dendritic polyglycerol conjugated gold nanostars for targeted photothermal therapy in breast cancer stem cells. *ACS Nano* **2021**, *15*, 15069-15084.
19. C. Nie, M. Stadtmüller, **B. Parshad**, M. Wallert, Y. Kerkhoff *et al.* Heteromultivalent nanostructures as potent and broad-spectrum influenza A virus inhibitors. *Science Advances* **2021***, 7,* eabd3803*.*
20. Krishna, **B. Parshad**, K. Achazi, C. Böttcher, R. Haag, S.K. Sharma. Newer Non-ionic A_2B_2-Type Enzyme-Responsive Amphiphiles for Drug Delivery. *ChemMedChem* **2021**, *16*, 1457.
21. M. Kumari, S. Prasad, L. Fruk, **B. Parshad**.* Polyglycerol-based hydrogels and nanogels: from synthesis to applications. *Future Med. Chem.* **2021**, *13*, 419-438.
22. S. Bhatia, M. Hilsch, J. Camacho, K. Ludwig, C. Nie, **B. Parshad** *et al.* Adaptive flexible sialylated nanogels as highly potent influenza A virus inhibitors. *Angew. Chem. Int. Ed.* **2020**, *59*, 12417-12422.
23. R. Randriantsilefisoa, C. Nie, **B. Parshad**, Y. Pan, S. Bhatia, R. Haag. Double trouble for viruses: a hydrogel nanocomposite catches the influenza virus while shrinking and changing color. *Chem. Commun*. **2020**, *56*, 3547-3550.
24. C. Nie, **B. Parshad**, Y. Pan, S. Bhatia, R. Haag. Topology-matching design of an influenza neutralizing spiky nano-inhibitor with a dual mode of action. *Angew. Chem. Int. Ed.* **2020**, *59*, 15532-15536.
25. **B. Parshad**, S. Prasad, S. Bhatia, A. Mittal, Y. Pan *et al.* Non-ionic small amphiphile based nanostructures for biomedical applications. *RSC Adv.* **2020**, *10*, 42098-42115.
26. **B. Parshad**, P. Yadav, Y. Kerkhoff, A. Mittal, K. Achazi *et al.* Dendrimers-based micelles as Cyto-compatible Nanocarriers. *New. J. Chem*. **2019**, *43*, 11984-11993.

27. **B. Parshad**,[#] P. Manchanda, A. Kumar, R.K. Tiwari, A.N. Shirazi *et al.* Design, Synthesis, and Evaluation of the Kinase Inhibition Potential of Pyridylpyrimidinylaminophenyl Derivatives. *Arch. Pharm. Chem. Life Sci*. **2017**, *350*, e1600390.
28. **B. Parshad**, M. Kumari, K. Achazi, C. Böttcher, R. Haag, S.K. Sharma. Chemo-Enzymatic Synthesis of Perfluoroalkyl-functionalized Dendronized Polymers as Cyto-compatible Nanocarriers for Drug Delivery Applications. *Polymers* **2016**, *8*, 311.
29. **B. Parshad**, A.J. Duraisamy, S. Saini, P. Yadav, P. Vats, S.K. Sharma. Synthesis and SAR study of antioxidant potential of polyhydroxy coumarin derivatives. *Med. Chem.* **2016**, 6, 506.
30. R. Miri, M. Nejati, L. Saso, F. Khakdan, **B. Parshad** *et al.* Structure-activity relationship studies of 4-methylcoumarin derivatives as anticancer agents. *Pharm. Biol.* **2016**, *54*, 105-110.
31. P. Yadav, **B. Parshad**, P. Manchanda, S.K. Sharma. Chromones and their Derivatives as Radical Scavengers: A Remedy for Cell Impairment. *Curr. Top. Med. Chem.* **2014**, *14*, 2552-2575.

2. Book chapters

1. M. Kumari, **B. Parshad**, J.S. Yadav, S. Kumar (2021). Chapter 13: Functionalized Nanomaterials for Catalytic Application: Trends and Developments for the book entitled “Functionalized Nanomaterials for Catalytic Application”. https://onlinelibrary.wiley.com/doi/abs/10.1002/9781119809036.ch13

2. W. Etheridge, **B. Parshad**, I. Ahmed, L. Fruk. Chapter 1: Nanomedicine - Historical Perspective for the edited book entitled “Nanotherapeutics for Infectious Diseases” Jenny Stanford Publishing (Taylor & Francis), ISBN: 9789815129366.

3. V. Khatri, P. Yadav, V.B. Singh, M.P. Singh, A.K. Singh, **B. Parshad**.* Chapter 14: Porphyrin-functionalized hybrid materials for biosensing applications for the edited book entitled “Recent Advances in Nanomaterials for Electrochemical Sensing”. Taylor & Francis (accepted)

4. P. Singh, P. Yadav, **B. Parshad**,* D. Yadav, Sushmita, M. Kumar (2024). Chapter 12: Hybrid organometallic compounds as potent antimalarial agents for the book entitled “Recent Advances in Organometallic Chemistry”. Elsevier, ISBN: 9780323905961. https://shop.elsevier.com/books/recent-advances-in-organometallic-chemistry/ansari/978-0-323-90596-1

3. Conference proceeding

1. L., Buhl, M., Dolling, Y., Wang, **B. Parshad**, X. Li et al. New models of innovation through collaboration: the translation journey of novel concepts in corneal refractive surgery. *Proc. of SPIE* **2023**, Vol. *12627*, pp. 126270P-1.

Conference/workshop presentations

1. **Poster presentation**: Military Health System Research Symposium (MHSRS-2024) held on 26-30 Aug 2024, Orlando, Florida, USA; **Title**: *Hydrogel Nanocomposite-based Coating for Oxygen Sensing Film used within Extracorporeal Perfusion Systems.*

2. **Invited Lecture**: Physics Colloquium held on 22 May 2024, Physics Institute of the Autonomous University of San Luis Potosi, Mexico; Title: *Dual-Action Multivalent Architectures as Potent Influenza A Virus Inhibitors*.

3. **Oral presentation**: Military Health System Research Symposium (MHSRS-2023) held on 14-17 Aug 2023, Orlando, Florida, USA; **Title**: *A Robust Biocompatible Hydrogel as Coating Material for Oxygen-Sensing Films used within Extracorporeal Perfusion Systems*.

4. **Invited lecture**: 2nd International Conference on Advanced Developments in Chemistry and Allied Sciences-2023 (ADCAS-23) held on 17-18 Jan 2023, DCRUST, Murthal, India; **Title**: *Bio-imprinted reversible hydrogel for the detection of influenza A virus*.

5. **Invited lecture**: International Conference on New Trends in Chemical Research (ICNTCR-2022) held on 29-30 April 2022, Govt College Matak Majri, Karnal, India; **Title**: *Influenza Virus Inhibition by Multivalent Polymeric Systems*.

6. **Invited lecture**: Zero to Infinity: International Workshop on Career Awareness held on 18-22 January 2022, Govt College Matak Majri, Karnal, India; **Title**: *Drug Delivery Nanocarriers*.

7. **Invited lecture**: International Conference (Virtual) on Recent Advances in Chemical Sciences (ICRACS-2021) held on 14-16 July 2021, YMCA Faridabad, India; **Title**: *Multivalent Architectures as Broadly Active Inhibitors of Influenza A Virus*.

8. **Invited lecture**: Department of Chemistry, 28 Oct 2020, SRM University, Sonipat, India; **Title**: *Nanomedicine: Drug Delivery Nanocarrier*.

9. **Invited lecture**: Govt. College for Women, 1 March 2021, Murthal, Sonipat, India; **Title**: *Nanomedicine: Drug Delivery Nanocarrier*.

10. **Oral presentation**: 1st International Conference on Advanced Developments in Chemistry and Allied Sciences-2021 (ADCAS-21) held on 16-17 Dec 2021, DCRUST, Murthal, India; **Title**: *Multivalent glycoconjugates as pathogen inhibitors*.

11. **Poster presentation**: International Symposium 2016 “Functional Biointerfaces” held on 4-5th Dec 2016, Freie Universität Berlin, Germany; **Title**: *Chemo-enzymatic Synthesis of Perfluoroalkyl-functionalized Polymers as Cyto-compatible Nanocarriers for Drug Delivery Applications*.

12. **Oral presentation**: DU-JAIST Indo-Japan Symposium on “*Chemistry of Functional Molecules/Materials*” held on 26-27 Feb 2016, Department of Chemistry, University of Delhi, India; **Title**: *Synthesis and evaluation of antioxidant potential of polyphenolic coumarin derivatives*.

13. **Oral presentation**: Indo-Portuguese Workshop on “*Emerging Trends of Nanotechnology in Chemistry and Biology*” held on 12-13 Feb 2016, Hansraj College, University of Delhi, India; **Title**: *Synthesis and SAR study of antioxidant potential of polyhydroxy coumarin derivatives*.

14. **Poster Presentation**: 2nd Indo-German Workshop on "*Supramolecular Chemistry*" held on 30th March 2015, Department of Chemistry, University of Delhi, India; **Title**: *Synthesis of Multivalence Dendritic Architectures Using Divergent Approach and Study of Their Metal Ion Sensing Application*.

15. **Poster Presentation**: 10th International Symposium on *Bio-Organic Chemistry* (ISBOC-10) held on 11-15 Jan 2015, IISER Pune, India; **Title**: *Synthesis and Antimicrobial Activity Evaluation of Amides & Quaternary Ammonium Derivatives of Coumarin*.

16. **Poster Presentation**: 20th ISCB International Conference (ISCBC-2014) on "*Chemistry and Medicinal Plants in Translational Medicine for Healthcare*" held on 1-4 March 2014, Department of Chemistry, University of Delhi, India; **Title**: *Synthesis and Antioxidant Activity Evaluation of Chromenones*.

Teaching Experience

Online teaching: GEC academy, China. Designed and taught the following course:
Course: Bio-nanotechnology - Nanotechnology meets Nanomedicine and Biosensing.
Lecture 1. Introduction to nanotechnology
Lecture 2. Functionalization of nanomaterials
Lecture 3. Applications of DNA and antibody functionalized nanomaterials
Lecture 4. DNA origami
Lecture 5. Nano-biosensors
Lecture 6. Nanocarriers
Lecture 7. Multivalent nano-inhibitors against pathogens

Association with Professional Bodies

Membership of Scientific Societies

1. American Association for Advancement of Science (AAAS member: 60560201)
2. Chemical Research Society of India, India (CRSI: LM 4004)
3. American Chemical Society, USA (ACS member: 32762896)
4. Royal Society of Chemistry, UK (RSC member: 747139)
5. Society of Photo-Optical Instrumentation Engineers, USA (SPIE member: 0000000009)

Reviewer of scientific journals

1. RSC: *Polymer Chemistry*
2. Taylor & Francis online: *Journal of Biomaterials Science: Polymer Edition*
3. MDPI: *Polymers, Foods, Journal of Composites Science*
4. Elsevier: *Carbohydrate Polymers, Journal of Drug Delivery Science and Technology, International Journal of Biological Macromolecules*