Ramesh U. Batwal (Ph. D.)
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Fields of Specialization:

Organic Synthesis, Drug Discovery, Active Pharmaceutical Ingredients Synthesis and Process Development, Peptide Nucleic Acids (PNAs) Synthesis, Peptide Synthesis

Academic Qualifications:

Ph. D. Organic Chemistry (2016), Pune University (Savitribai Phule Pune University of Pune), Maharashtra, India.

Thesis: Studies on Chemical and Chemoenzymatic Total Synthesis of Bioactive Natural Products

Supervisor: Dr. Narshinha P. Argade, Chair and Chief Scientist: Organic Chemistry Division, National Chemical Laboratory, Pune

M. Sc. Organic Chemistry (2007) Organic Chemistry, **A grade** (GPA: 6.41), Department of Chemistry, Savitribai Phule Pune University, Pune (MH), India.

B. Sc. Chemistry (2005), **First Class with Distinction** (86.91%), Savitribai Phule Pune University (MH), India.

Work and Research Experience:

April 2019 to Present: Senior Scientist at NeuBase Therapeutics, Inc.

- Reduced the manufacturing cost of drugs by optimizing the process for multigram synthesis peptide nucleic acids oligomers (5 µmol to 12 mmol scale).
- Optimized the process of peptides synthesis to improve the yield and crude purity of the products (5 µmol to 12 mmol) using peptide synthesizer.
- Developed protocol to simplify purification of oligomers to avoid multiple purifications ultimately resulting the reduced cost of oligomer drug products and completion of projects well before deadline.
- Designed peptide-nucleic acids (PNAs) to bind target mutant genes.
- Designed and developed cost efficient and robust new synthetic routes for various modified nucleobases and their purification.
- Developed the cost-efficient process and synthesized peptide nucleic acids monomers at 100 g scale and transferred technology for scale up at kg scale.
- Analytical characterization of PNA monomers, modified nucleobases, and their oligomers using a variety of techniques (UV-Vis, NMR, Mass spectroscopy, MALDI-TOF, HPLC) and developed new analytical methodologies for PNA chemistry.
- Working with CRO and CDMO for managing supply chain of raw materials.
- Set up new chemistry lab with the team for startup company (NeuBase Therapeutics, Inc.)

May 2017 to April 2019: Postdoctoral Researcher at Carnegie Mellon University, USA

- Designed and synthesized natural and modified nucleobases of peptide nucleic acids at multigram scale.
- Designed and synthesized peptide nucleic acid monomers for oligomer synthesis.
- Synthesized and purified the peptide nucleic acids oligomers for biological studies.

May 2016 to April 2017: Principal Scientist at Innovassynth Technologies (I) Ltd.

- Designed and successfully completed the synthesis of novel nucleosides and nucleotides.

- Improved existing processes to reduce cost and increase reliability, purity, and safety.

July 2009 to April 2016: Ph. D. Research (Supervisor: Dr. Narshinha P. Argade, National Chemical Laboratory, Pune, India)

- Developed lipase catalyzed new procedures for resolution of racemic allyl alcohols, allyl acetates as well as α-hydroxy ketones.
- Completed the first total synthesis of (+)-1,3,4,5-tetragalloylapiitol, (+)-artabotriolcaffeate, gigantamide A, dasyclamide and cucullamide and sesquiterpenes (–)-aristelegone D, (–)-7-methoxy-1,2-dihydrocadalene and (+)-heritonin.
- Successfully completed the synthesis of (+)-grandiamide D, (–)-aristelegone B, (+)-methylaristelegone A, (+)-aristelegone A, (–)-heritonin, 7-methoxycadalene.
- Successfully completed the formal synthesis of (–)-tulipalin B, (–)-heritol, (–)-7-methoxycalamenene, (+)-mutisianthol, 7-hydroxycadalene.

June 2007 to July 2009: **Research Associate (R&D)** at **Lupin Research Park, Pune** (Lupin Ltd), India.

- Developed novel routes for the synthesis of active pharmaceutical ingredients (API).
- Subsequently developed an efficient process for manufacturing of active pharmaceutical ingredients (API) at 100 Kg scale.
- Successful transferred technology from R&D to production for API manufacturing.

Honors and Awards:

- Qualified "**Junior Research Fellowship**" in Joint CSIR-UGC Test for Junior Research Fellowship and Eligibility for Lectureship held on 21st December, 2008.
- Qualified "**Junior Research Fellowship**" in Joint CSIR-UGC Test for Junior Research Fellowship and Eligibility for Lectureship held on 21st July, 2009 (**All India Rank- 16**).
- Qualified in "**Graduate Aptitude Test in Engineering**" (GATE) in Chemistry held on 8th February, 2009 (**Percentile Score- 96.49, All India Rank- 229**).

Publications:

1) **Batwal, R. U.**; Argade, N. P. "Chemoenzymatic Collective Synthesis of Optically Active Hydroxyl(methyl)tetrahydronapthalene Based Bioactive Terpenoids" *Org. Biomol. Chem.* **2015**, *13*, 11331.

2) Deore, P. S.; **Batwal, R. U.**; Argade, N. P. "Synthesis of Yangjinhualine A" *Synthesis* **2015**, *47*, 483.

3) **Batwal, R. U.**; Argade, N. P. "Biology-Orientated Synthesis of Putrescine Bisamides Gigantamide A, Dasyclamide and Cucullamide" *Synthesis* **2013**, *25*, 2888.

4) **Batwal, R. U**.; Patel, R. M.; Argade, N. P. "Chemoenzymatic total synthesis of potent HIV RNase H inhibitor (−)-1, 3, 4, 5-tetragalloylapiitol" *Tetrahedron*: *Asymmetry* **2011**, *22*, 173.

5) **Batwal, R. U.**; Argade, N. P. "Chemoenzymatic Access to (+)-Artabotriol and its Application in Collective Synthesis of (–)-Tulipalin, (+)-Grandiamide D, (+)-Artabotriolcaffeate" *Synthesis* **2016**, *48*, 2130.

Patents:

1. Danith H. LY, Shivaji A. Thadke, **Ramesh U. Batwal**, Valentina DI CARO, Dietrich A. Stephan, Letha J. Sooter, Samuel I. Backenroth. Modified peptide nucleic acid compositions.

US20210309700A1.
2. Danith H. LY, Shivaji A. Thadke, **Ramesh U. Batwal**, Valentina DI CARO, Dietrich A. Stephan, Letha J. Sooter, Samuel I. Backenroth. Modified peptide nucleic acid compositions. US20210324012A1.
3. Danith H. LY, Shivaji A. Thadke, **Ramesh U. Batwal**, Valentina DI CARO, Dietrich A. Stephan, Letha J. Sooter, Samuel I. Backenroth. Modified peptide nucleic acid compositions. US20210309997A1.
4. Danith H. LY, Shivaji A. Thadke, **Ramesh U. Batwal**, Valentina DI CARO, Dietrich A. Stephan, Letha J. Sooter, Samuel I. Backenroth. Modified peptide nucleic acid compositions. WO2021202621A3.
4. Few patents are under disclosure stage.

Poster Presentations and Participations:

- 8th J-NOST Conference for Research Scholars (IIT Guwahati), Dec. 15-17, 2012: Poster Presented Entitled 'Chemoenzymatic Total Synthesis of Potent HIV RNase H Inhibitor (–)-1,3,4,5-Tetragalloylapiitol'.
- 13th Eurasia Conference on Chemical Sciences (IISc, Bangalore), Dec. 14-18, 2014: Poster Presented Entitled 'Total Synthesis of (–)-1,3,4,5-Tetragalloylapiitol and Putrescine Bisamides gigantamide A, dasyclamide and cucullamide'.
- Attended ACS on Campus Workshop Held on Oct. 10, 2012 at NCL Pune.

Personal Details*:*

Date of Birth: 12/09/1984 Nationality: Indian
Sex: Male Languages Known: English, Hindi and Marathi
Marital Status: Married Place of Birth: Pune
Current Address: 240 Melwood Ave Apt #E4 Pittsburgh PA USA 15213
Permanent Address: Flat No 3A-404, Kalpataru Estate Phase 1, Jawalkarnagar, Pimplegurav Pune, Maharashtra, India 411061

Other Core Competencies:

- HPLC
- MALDI-TOF
- Mass Spectroscopy
- NMR
- Purification of Oligomers
- Strong ability to work in teams and collaborations
- Scientific literature search by SciFinder, Reaxys, Beilstein CrossFire

References:

Dr. Thomas Zengeya
Designation: Senior Principal Investigator
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Dr. Narshinha P. Argade

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Date: Ramesh U Batwal (Ph. D.)