XXIV NOST – Organic Chemistry Conference

March 3rd – March 6th, 2025

Program & Abstracts

Venue: Jaypee Palace, Agra, India

NOST TRUSTEES

Program Schedule

March 3, 2025 (Monday)

14.00 to 15.20 h	**Arrival, Check-In and Registration**

15.30 to 15.35 h	**Welcome Remarks by Chair-NOST Council** Krishna P Kaliappan (IIT Bombay)
15.35 to 15.45 h	**NOST- A Brief Overview by President-NOST** Ganesh Pandey (BHU, Varanasi)

Trustees Session	
Session I (15.45 to 17.40 h)	**Chairpersons: D. S. Reddy and Jerome Lacour**
15.45 to 16.15 h	**Peter Seeberger (Max Planck Institute, Potsdam, Germany)** ‘Curiosity Driven Chemical Research is Key to Developing Vaccines, Medications and a Circular Chemical Economy’
16.15 to 16.45 h	**Srinivas Hotha (IISER Pune)** ‘CIStER: A Chemical Glycan Editing Reaction Sequence’
16.45 to 17.05 h	**Namrata Rastogi (CSIR-CDRI, Lucknow)** ‘Reactivity Pattern of Diazo Group in Hypervalent Iodine Diazo Reagents’
17.05 to 17.25 h	**Rajarshi Samanta (IIT Kharagpur)** ‘Transition Metal Catalyzed Insertion of Diazoquinones’
17.25 to 17.40 h	**Tea Break**

Kondaiah and Palle Session	
Session II (17.40 to 19.20 h)	**Chairpersons: Nitin Patil and Vidya Avasare**
17.40 to 18.00 h	**Indranil Chatterjee (IIT Ropar)** ‘Light-Camera-Action: Shining Visible Light on Hantzsch Ester’
18.00 to 18.20 h	**Pavan Kancharla (IIT Guwahati)** ‘Frustrated Bronsted Pair Catalysis for Carbohydrate Chemistry and Beyond’
18.20 to 18.50 h	**Scott Snyder (University of Chicago, USA)** ‘Strategies for the Rapid Synthesis of Molecular Complexity’
18.50 to 19.20 h	**David Sarlah (Rice University, USA)** “TBA”
19.30 to 21.30 h	**Conference Mixer**

March 4, 2025 (Tuesday)

Astra Zeneca Session	
Session III **(09.00 to 11.00 h)**	**Chairpersons: Swapnil Yerande & Diwan Rawat**
09.00 to 09.30 h	**Shu Kobayashi (University of Tokyo, Japan)** ‘Flow Methods for Organic Synthesis Toward a Sustainable Society’
09.30 to 10.00 h	**Vidya Ramadas (Enveda, Hyderabad)** ‘Discovery of Drugs for Hepatitis C: A Race Against Time & Key Learnings’
10.00 to 10.20 h	**Ch. Raji Reddy (CSIR-IICT, Hyderabad)** ‘Cascade Functionalization/Annulation of Enyne Precursors’
10.20 to 10.40 h	**Suman De Sarkar (IISER Kolkata)** ‘Regulating Chemoselectivity through Controlled Electrolysis’
10.40 to 11.00 h	**Indubhushan Deb (CSIR-IICB, Kolkata)** ‘Access to Functionalized *N*-Heterocycles *via* Electrochemical Synthesis and Annulation Reactions’
11.00 to 11.30 h	**Photo Session & TEA/COFFEE BREAK**

Cipla Session	
Session IV **(11.30 to 13.00 h)**	**Chairpersons: Stellios Arseniyadis & Rajib Goswami**
11.30 to 12.00 h	**Alexander Zografos (Greece)** ‘Simplifying biosynthesis: how to access the natural complexity of sesquiterpenoids following easy steps’
12.00 to 12.30 h	**G. Sekar (IIT Madras)** ‘Asymmetric Domino Synthesis of Chiral Heterocyclic Compounds using Organocatalysts’
12.30 to 13.00 h	**Sunkyu Han (KAIST, South Korea)** ‘Biosynthetically Inspired Synthesis of Complex Natural Products’
13.00 to 14.30 h	**LUNCH BREAK**
14.30 to 15.30 h	**Panel Discussion on “Fostering Entrepreneurships by Chemists”**
15.30 h to 16.00 h	**Tea Break/NOST Trustees Meeting**

Panacea Biotech Session	
Session V **(16.00 to 18.00 h)**	**Chairpersons: Ramakrishna Peddiniti & S. S. V. Ramasastry**
16.00 to 16.30 h	**Hirohashi Ohmiya (Kyoto University, Japan)** ‘Radical Catalysis’
16.30 to 17.00 h	**Shoubhik Das (Baeyreuth University, Germany)** ‘Selectivity-Driven Sustainability by Using Single Atom Photocatalysts’
17.00 to 17.20 h	**Alkananda Hajra (Viswa-Bharati University, Kolkata)** ‘Molecular Editing of Azaheterocycles’

17.20 to 17.40 h	**Ravi P. Singh (IIT Delhi)** ‘Atropisomerism in the Realm of Pharmaceutically Relevant Compounds’
17.40 to 18.00 h	**Shikha Gandhi (IISER Berhampur)** ‘Palladium/Brønsted acid catalyzed propargylic C-H activation’

Jubilant Life Sciences Session	
Session VI (18.00 to 19.20 h)	**Chairpersons: T. Rajamannar & Srinivas Oruganti**
18.00 to 18.30 h	**George O’Doherty (Northeastern University, Boston, USA)** ‘De Novo Asymmetric Synthesis for Natural Product S-SAR’
18.30 to 19.00 h	**M. Manoharan (Alnylam Pharmaceuticals, USA)** ‘Biomimetic Chemistry of RNA Therapeutics ‘
19.00 to 19.20 h	**Basker Sundararaju (IIT Kanpur)** ‘Evolution of Co(III)-Catalysis in Asymmetric C-H Bond Functionalizations’
19.30 to 21.30 h	**Dinner**

March 5, 2025 (Wednesday)
06.00 to 09.00 h Visit to Taj Mahal

Syngenta Session	
Session VII (11.00 to 13.00 h)	**Chairpersons: N. Selvakumar & Vishal Rai**
11.00 to 11.30 h	**Suvarn Kulkarni (IIT Bombay)** ‘Total Synthesis of Zwitterionic Polysaccharide Repeating Units’
11.30 to 12.00 h	**Uttam Tambar (UT Southwestern, USA)** ‘Stereoselective Reactions with Feedstock Chemicals’
12.00 to 12.20 h	**Prasanta Ghorai (IISER Bhopal)** ‘Bifunctional Organocatalytic Michael Additions as the Key Strategy: Enantioselective Synthesis of Fused and Spirocyclic Organic Molecules’
12.20 to 12.40 h	**Ramakrishna G. Bhat (IISER Pune)** ‘Versatile Reactivity of Diazo Carbonyl Compounds Towards Metal Catalysts and Visible Light’
12.40 to 13.00 h	**P. Rajamalli (IISc, Bangalore)** ‘A Rigid Xanthene-Anthracene based Scaffold Exhibiting Ultra Deep-Blue Emission with CIE_y of 0.06: Multifunctional Material as Emitter and Host for blue OLEDs’
13.00 to 16.00 h	**Lunch Break/Free Time for Interactions**

BASF Session	
Session VIII (16.00 to 18.00 h)	**Chairpersons: Harish Shinde & Akhila Kumar Sahoo**
16.00 to 16.30 h	**Santanu Mukherjee (IISc, Bangalore)** ‘Symmetry Breaking Routes to Natural and Unnatural Ladderanes’
16.30 to 17.00 h	**Anastasios Polyzos (University of Melbourne, Australia)** ‘New Strategies in Catalytic Radical Carbonylation of Organohalides’
17.00 to 17.20 h	**Srinivasarao Y (University of Hyderabad)** ‘Propargyl-Claisen Rearrangement: Beyond Allenes’
17.20 to 17.40 h	**Kalyaneswar Mandal (TIFR, Hyderabad)** ‘Exploring Reciprocal Chiral Specificity to Inhibit Red Blood Cell Invasion by Malaria Parasites’
17.40 to 18.00 h	**Benudhar Punji (CSIR-NCL Pune)** ‘C-H Alkylation of Heteroarenes Using Unactivated Alkyl Halides Enabled by Iron and Nickel Catalysts’

ICOS Session (Flash Presentation) Chairpersons: Santosh J. Gharpure & Dattatraya Dethe	
18.10 to 19.30 h	**1. Kiran Kumar (IISER, Tirupati)** **2. Alagiri Kaliyamoorthy (IISER, TVM)** **3. Amit Simlandy (IISER Berhampur)** **4. Rajeshwar Rao (IIT Dharwad)** **5. Mintu Porel (IIT Palakkad)** **6. Amrita Hazra (IISER Pune)** **7. J. Nithyanandan (CSIR-NCL-Pune)** **8. D. Sharada (Pondicherry University)**
19.30 to 21.30 h	**Banquet Dinner**

March 6, 2025 (Thursday)

Sun Pharma Session	
Session IX (09.00 to 11.30 h)	**Chairpersons: Sivapriya K. & T. Punniyamurthy**
09.00 to 09.30 h	**Alakesh Bisai (IISER Kolkata)** 'Total Synthesis of Complex Natural Products of Biological Relevance'
09.30 to 10.00 h	**Rene Koenigs (RWTH Aachen, Germany)** 'Spin states matter - fundamentals, applications and translation to drug discovery'
10.00 to 10.30 h	**T. Govindaraju (JNCASR, Bengaluru)** 'Multifaceted Approaches to Mitigating Alzheimer's Disease'
10.30 to 10.50 h	**Indresh Kumar (BITS Pilani)** 'Asymmetric Synthesis of Bridged Nitrogen Heterocycles by Exploring the Potential of 3-Oxindolium Ion Intermediate'
10.50 to 11.10 h	**Chandrakumar Appayee (IIT Gandhinagar)** 'Development of chiral secondary amine organocatalysts and their applications'
11.10 to 11.30 h	**Concluding Remarks**
11.30 to 12.00 h	**High Tea**

12.00 h Departure

ABSTRACTS

Trustees Session;
Chairpersons: D. S. Reddy and Jerome Lacour

Peter H. Seeberger
Managing Director
Max-Planck Institute for Colloids and Interfaces
Potsdam, Germany
E-Mail: peter.seeberger@mpikg.mpg.de

Homepage: https://www.mpikg.mpg.de/biomolecular-systems/director/peter-seeberger

Peter H. Seeberger studied chemistry in Erlangen (Germany) and completed a PhD in biochemistry in Boulder (USA). After a postdoctoral fellowship at the Sloan-Kettering Cancer Center Research in New York he advanced to tenured Firmenich Associate Professor of Chemistry at MIT. After six years as Professor at the Swiss Federal Institute of Technology (ETH) Zurich he assumed positions as Director at the Max-Planck Institute for Colloids and Interfaces in Potsdam and Professor at the Free University of Berlin in 2009. In addition, he serves as honorary Professor at the University of Potsdam. From 2003-2014 he was Affiliate Professor at the Sanford-Burnham Institute for Medical Research (La Jolla, USA). Since 2021, he is a Vice President of the German Research Foundation (DFG) the main funding body in Germany. Since 2023, Seeberger is the Founding Director of the “Center for the Transformation of Chemistry” that received €1.25 billion funding. He is a member of the governing body of the Max-Planck Society (“Senate”) and the Veterinary University (TiHo) Hannover (“Stiftungsrat”).

Professor Seeberger’s research on the chemistry and biology of carbohydrates, carbohydrate vaccine development and continuous flow synthesis of drug substances spans a broad range of topics from engineering to immunology and has been documented in over 680 peer-reviewed journal articles, five books, more than 60 patents, over 200 published abstracts and more than 1.000 invited lectures. He is one of the editors of the standard textbook “Essentials of Glycobiology”. His work was recognized with more than 40 international awards from the US (*e.g.* Arthur C. Cope Young Scholar Award, Horace B. Isbell Award, Claude S. Hudson Award from the American Chemical Society), Germany (*e.g.* Körber Prize for European Sciences, Wissenschaftspreis des Stifterverbandes, Emil Fischer Medal), Holland (Havinga Medal), Israel (Honorary Lifetime Member Israel Chemical Society), Japan (Yoshimasa Hirata Gold Medal), Switzerland (“The 100 Most Important Swiss”), the Philippines (“Gusi Peace Prize”), the Czech Republic (Dr. h.c. Univ. Chem. Tech. Prague), the UK (RSC Khorana Prize 2024) and international organizations (Whistler Award 2012, Int. Carboh. Soc.). In 2013 he was elected to the Berlin-Brandenburg (Prussian) Academy of Sciences.

Prof. Seeberger supports open access publishing as the Editor-in-Chief of the *Beilstein Journal of Organic Chemistry* and serves on the editorial advisory boards of many other journals. The research in the Seeberger laboratory has given rise to nine successful companies in the USA, Switzerland, Denmark and Germany.

Curiosity Driven Chemical Research is Key to Developing Vaccines, Medications and a Circular Chemical Economy

Peter H. Seeberger

Max-Planck Institute for Colloids and Interfaces and
Freie Universität Berlin, Am Mühlenberg 1, 14476 Potsdam (Germany)
peter.seeberger@mpikg.mpg.de

Curiosity driven, "basic" research contributes in many ways to the development and progress of industrialized countries. In this lecture I will demonstrate how fundamental studies of glycosylation reactions[1] resulted eventually in the development of glycoconjugate vaccines, [2] anti-glycan antibody therapeutics,[3] diagnostics[4] and automated methods[5] to produce life-saving medications in a cost-effective manner. [6]

The Center for the Transformation of Chemistry (CTC) received $1.5 billion to address one of the most pressing challenges of the 21st century and at the same time establish and expand a place of cutting-edge research that is highly attractive for specialists as well as partner institutions from science and industry.

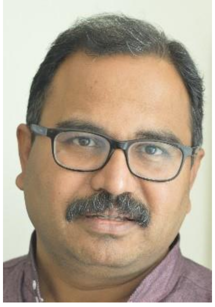
The future supply of chemicals and pharmaceuticals must be ensured through local, cost-effective and sustainable production processes mainly from renewable raw materials or recycled materials, while complying with the highest occupational safety and environmental standards and drastically shortening transport routes.

Without a transformation of the chemical industry, climate targets cannot be achieved, economic prosperity cannot be maintained, and future-proof employment opportunities cannot be realized. Simultaneously meeting climate, economic and employment targets and preserving a sustainable industry cannot be achieved simply by quickly curing symptoms, but only through a structured transformation designed for the long term.

References

1. Plante, O.J.; Palmacci, E.R.; Seeberger, P.H.; *Science* **2001**, *291*, 1523.
2. Seeberger, P.H.; *Chem. Rev.* **2021**, *121*, 3598.
3. Goerdeler, F.; Khan Khilji, S.; Lühle, J.; Frensemeier, K.; Warschkau, D.; Schirmeister, F.; Chen, Z.A.; Malik, A.; Garg, M.; Varon Silva, D.; Turak, O.; Mallagaray, A.; Boerno, S.; Timmermann, B.; Rappsilber, J.; Seeberger, P.H.; Moscovitz, O.; *Cell Chem. Bio.* **2022**, *29*, 1353.
4. Geissner, A.; Seeberger, P.H. *Ann Rev Anal Chem* **2016**, *9*, 223; Pröbstel, A.-K.; …Seeberger, P.H.; Gommerman, J.L.; Schirmer, L.; Wilson, M.R.; Baranzini, S.E.; *Science Immunology* **2020**, 5, eabc7191.
5. Chatterjee, S.; Guidi, M.; Seeberger, P.H.; Gilmore, K.; *Nature* 2020, *579*, 379.
6. Triemer, S.; Gilmore, K.; Truong Vu, G.; Seeberger, P.H.; Seidel-Morgenstern, A.; *Angew.Chem.Int.Ed.* 2018, *57*, 5525.

Srinivas Hotha
Professor
Department of Chemistry
Indian Institute of Science Education and Research, Pune
E-Mail: s.hotha@iiserpune.ac.in



Homepage: http://www.iiserpune.ac.in/~s.hotha

Srinivas Hotha earned his MSc (Chemistry) from the University of Hyderabad in 1993, MTech (Biochem Engg) from IT-BHU, Varanasi in 1995 and Ph. D. in Chemistry from Osmania University in 2001 for the work he carried-out at IICT Hyderabad and NCL Pune under the supervision of Dr. Mukund Gurjar. He was a Charles H. Revson postdoctoral fellow at Rockefeller University, New York USA from 2001-03. He returned to India, joined NCL Pune as a scientist and subsequently relocated Indian Institute of Science Education and Research (IISER), Pune in November 2010 wherein he is a Professor since 2016.

His research interests are in the application of sustainable methods for the synthesis of oligosaccharides of biological significance. Notably, he has developed, pioneered and nurtured the gold-catalyzed glycosidation method over the past 20 years.

CIStER: A Chemical Glycan Editing Reaction Sequence

Sumit Sen, Suman Kundu, Sandip Pasari, Srinivas Hotha*

Department of Chemistry, Indian Institute of Science Education and Research Pune
Pune – 411 008
(E-mail: s.hotha@iiserpune.ac.in)

Existing strategies for the syntheses of oligosaccharides follow convergent, divergent, chemical or enzymatic routes.[1] Contrary to these, nucleic acids enjoy the unique advantage of PCR, polymerases, and editing methods such as CRISPR[2] which have advanced the field to an unprecedented level. Unlike nucleic acids, oligosaccharides are lagging behind due to inherent challenges in their syntheses.[3]

In this lecture, a working framework will be presented for the editing of oligosaccharides viz. Cut-Insert-Stitch Editing Reaction (**CIStER**) technology that stands on the subtle reactivity patterns (Figure 1).[4]

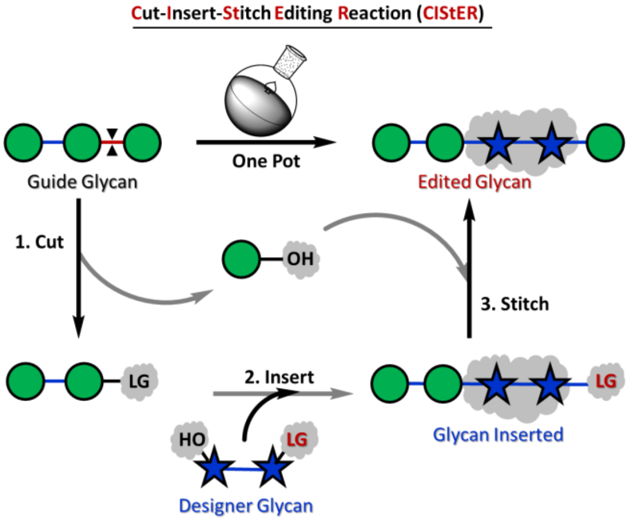


Figure 1: Chemical Glycan Editing

References

1. a) Thadke, S. A.; Mishra, B.; Islam, M.; Pasari, S.; Manmode, S.; Rao, B. V.; Neralkar, M.; Shinde, G. P.; Walke, G.; Hotha, S. *Nature Commun.*, 2017, **8**, 14019. b) Pasari, S.; Manmode, S.; Walke, G.; Hotha, S.; *Chem. Eur. J.*, 2018, **24**, 1128. c) Walke, G.; Kasdekar, N.; Sutar, Y.; Hotha, S. *Communications Chem.*, 2021, **4**, 15.
2. Hille, F.; Richter, H.; Wong, S. P.; Bratovič, M.; Ressel, S. *Cell*, 2018, **172**, 1239.
3. Xue, Y.; Dong, G. *Acc. Chem. Res.*, 2022, **55**, 2341-2354.
4. Sen, S.; Kundu, S.; Pasari, S.; Hotha, S. *Communications Chem.* **2024** (In press)

Dr. Namrata Rastogi,
CSIR-CDRI, Lucknow, India

Dr. Namrata Rastogi completed Ph.D. in synthetic organic chemistry from Indian Institute of Technology, Bombay in 2006. She worked as postdoctoral research associate at the Indian Institute of Technology, Kanpur and University of Minnesota, Minneapolis, USA, during 2006 to 2009. She then served as senior research scientist in Jubilant Biosys Drug Discovery and Development, Bengaluru, Karnataka for 2 years. Dr. Rastogi joined CSIR-Central Drug Research Institute, Lucknow in 2011, where rising through the ranks, she is currently at the position of Principal Scientist.

Dr. Namrata is recipient of several awards and fellowships including INSA-DFG Scientist Bilateral Exchange Fellowship-2014, ISCB Distinguished Woman Scientist-2019, CRSI Bronze Medal-2023, CRS Bronze Meadal-2024 and DST-SERB POWER Fellowship-2024. She also served/serves on the editorial board of several journals including Asian Journal of Organic Chemistry, Synthesis, Journal of Chemical Sciences, Tetrahedron, and Tetrahedron Letters.

Reactivity Pattern of Diazo Group in Hypervalent Iodine Diazo Reagents

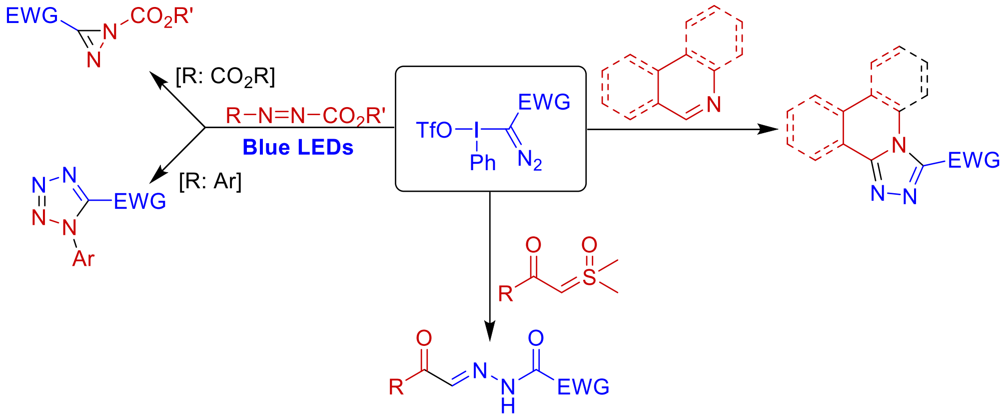
Namrata Rastogi

Medicinal & Process Chemistry Division, CSIR-CDRI, Lucknow, India

The diazo compounds are among the most valuable building blocks in organic chemistry due to their versatile chemical profile.[1] The inherent ambiphilicity of diazo group owing to the nucleophilic diazo-bearing carbon and electrophilic terminal nitrogen atom imparts unique reactivity to diazo-bearing compounds. However, installing a nucleofugal group on the diazo carbon as in Hypervalent Iodine Diazo Reagents (**HIDR**) leads to the inversion or umpolung of the diazo-polarity. While the **HIDR** can be employed as electrophilic diazomethylating agents under thermal conditions,[2] they serve as the precursor of diazomethyl radical species under visible light photoredox catalyzed conditions.[3]

We utilized **HIDR** for the electrophilic diazomethylation of several azaarenes followed by 1,5-cyclization of the resulting ammonium diazonium ylides to prepare corresponding 4,3-fused 1,2,4-triazolyl-azaarenes.[4] On the other hand, nucleophilic attack on the terminal nitrogen of the HIDR by sulfoxonium ylides led to the formation of hydrazineyl moiety-inserted products.[5]

Further, trapping of diazomethyl radicals, generated from **HIDR** under photoredox conditions, with azocarboxylates led to the divergent access to *1H*-diazirines and 1H-tetrazoles depending upon the substituents in the azo-substrate.[6] In the presentation, the observations and conclusions of the abovementioned transformations of Hypervalent Iodine Diazo Reagents will be discussed in detail.



References

1. Ford, A. ; Miel, H. ; Ring, A. ; Slattery, C. N. ; Maguire, A. R. McKervey M. A. *Chem. Rev.* **2015**, *115*, 9981-10080.
2. Weiss, R.; Seubert, J.; Hampel, F. *Angew. Chem. Int. Ed.* **1994**, *33*, 1952-1953.
3. Wang, Z.; Herraiz, A. G.; del Hoyo, A. M.; Suero, M. G. *Nature* **2018**, *554*, 86-91.
4. Devi, L.; Kumar, P.; Kant, R.; Rastogi, N. *Chem. Commun.* **2022**, *58*, 7062-7065.
5. Anand, V.; Kant, R.; Rastogi, N. *unpublished results*
6. Pathak, J.; Kant, R.; Rastogi, N. *unpublished results*

RAJARSHI SAMANTA
Associate Professor
Department of Chemistry
Indian Institute of Technology Kharagpur
Kharagpur, INDIA
e-Mail: rsamanta@chem.iitkgp.ac.in
Homepage: *https://www.rsamanta.com*

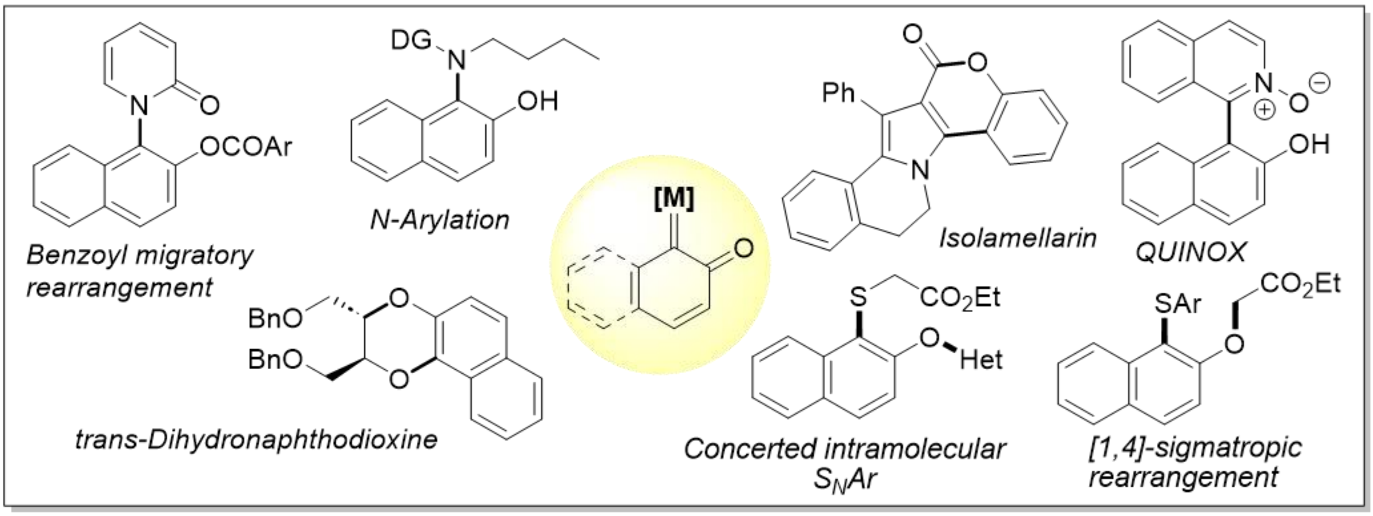
Rajarshi Samanta did his bachelor’s (2002) and master’s (2004) from Jadavpur University, Kolkata. He received his PhD from the Indian Institute of Chemical Technology, Hyderabad in 2010 under the supervision of Prof. Tushar Kanti Chakraborty. Subsequently, he moved to Max Planck Institute of Molecular Physiology, Dortmund, Germany, for his postdoctoral work under Prof. Andrey P Antonchick as a Max-Planck postdoctoral researcher. Then, he joined the Indian Institute of Technology, Kharagpur, as an assistant professor in September 2013. Currently he has been an associate professor in the same institute since August 2019. He has been an editorial board member of *Tetrahedron* and *Tetrahedron Letters* since 2024. He received the *Thieme Chemistry Journal Award* (2023), an *Associateship for the Indian Academy of Sciences* (2019-2022), and was selected as an *Emerging Investigator* in the New Journal of Chemistry (2021). His current research interests are (I) Straightforward synthesis of heterobiaryls and natural products using metal-carbenes and nitrenes (II) Development of macrocyclization methods using metal-carbenes (III) Step-economic construction of nitrogen-containing extended conjugated systems and studying their photophysical properties.

Transition Metal Catalysed Insertion of Diazoquinones

Rajarshi Samanta

Department of Chemistry, Indian Institute of Technology Kharagpur
Email: rsamanta@chem.iitkgp.ac.in

The diazo quinone or quinone diazide compounds have been recently explored to introduce phenol/naphthol moieties into the hydrocarbons and hetero atom-containing molecules under transition metal catalysis.[1] The reactions proceed via insertion or migratory insertion of quinoid carbenes into C–H/X-H bonds. In this presentation, the racemic synthesis of phosphine ligands like QUINAP, METHOX, PINAP, and PHENAP and the synthesis of isolamellarin natural products using the migratory insertion of quinoid carbene *via* C-C bond-forming reactions will be explained.[2,3] Next, *N*-arylation of electron-deficient systems will be discussed.[4,5] Further, the sigmatropic rearrangement with corresponding sulphur ylides will be illuminated.[6] Finally, the insertion of quinoid carbenes into *cis*-epoxides will be discussed with mechanistic details.[7]



Scheme 1: Synthetic strategies using quinoid carbene

References

1. *Related Reviews*: (a) Cheng, H.; Wang, X.; Tan, K.; Ren, X.; Guo, Z.; Wang, C.; Zhou, C. –Y. *Eur. J. Org. Chem.* **2025**, e202401282; (b) Bera, S.; Sarkar, S.; Samanta, R. *New J. Chem*. **2021**, *45*, 10135-10149.
2. Biswas, A.; Pan, S.; Samanta, R. *Org. Lett*. **2022**, *24*, 1631-1636.
3. Sarkar, S.; Samanta, R. *Org. Lett*. **2022**, *24*, 4536-4541.
4. Bera, S.; Roy, S.; Pal, S. C.; Anoop, A.; Samanta, R. *ACS Catal*. **2021**, *11*, 10847-10854.
5. Pan, S.; Kundu, S.; Samanta, R. *Org. Lett*. **2023**, *25*, 2873-2877.
6. Pan, S.; Md Saimuddin Sk., Sanyal, B.; Roy, L. Samanta, R. *ACS Catal*. **2024**, *14*, 18419-18428.
7. Bera, S.; Pan, S.; Samanta, R. (*manuscript communicated*)

Kondaiah and Palle Session;
Chairpersons: Nitin Patil and Vidya Avasare

Indranil Chatterjee
Associate Professor
Department of Chemistry
IIT Ropar
Contact Number: 8240424391
Email: indranil.chatterjee@iitrpr.ac.in

Homepage: https://sites.google.com/iitrpr.ac.in/ic-research-group-iit-ropar/home

Dr. Indranil Chatterjee obtained his B.Sc. from Calcutta University, India in 2006, and then he moved to IIT Kharagpur for his M.Sc. study. In 2008 he moved to Germany for his Ph.D. study at Westfälische Wilhelms-University Muenster under the guidance of Prof. Dr. Armido Studer, where his studies centred on catalytic asymmetric cycloaddition reactions. After finishing his Ph.D. study in November 2011, he joined as a Postdoctoral fellow with Prof. Paolo Melchiorre in ICIQ, Tarragona, Spain in March 2012. His area of research mainly focused on new organocatalytic cascade reactions. After that from 2014 to 2016 he did another Post-Doc with Prof. Martin Oestreich at the Technische Universität Berlin, concentrating his research on Lewis acid catalysis. In December 2016 he joined IIT Ropar as an Assistant Professor. Since August 2024, he is holding a position of Associate Professor at the Indian Institute of Technology Ropar, India.

Details of any fellowship/awards/honors

1. National Scholarship in Secondary and Higher Secondary exam. (2000 & 2002).
2. Ph.D. scholarship of the International Graduate School of Chemistry (GSC-MS), University of Muenster, Germany (2008-2011)
3. Postdoctoral Fellowship at ICIQ, Tarragona, Spain (2012-2014)
4. Cluster of Excellence UniCat Fellowship for Postdoctoral Research at Technical University Berlin, Germany (2014-2016)
5. Institute Best Teaching Award (2020).
6. Thieme Chemistry Journal Award, 2022.

Light-Camera-Action: Shining Visible Light on Hantzsch Ester

Indranil Chatterjee*

Indian Institute of Technology Ropar, Rupnagar, Punjab – 140001, India
(*Email: indranil.chatterjee@iitrpr.ac.in*)

When exposed to light, molecules in an electronically excited state undergo fascinating chemical reactions distinct from their behavior in the ground state.[1] This captivating principle lies at the core of photochemistry, giving rise to unprecedented transformations. In excited state, a molecule can serve as a superior electron donor (reductant) or a more effective electron acceptor (oxidant), capabilities unattainable through conventional ground-state reactivity.[2]
The redox reaction found in almost all living cells involves the conversion between NAD+ and NADH. This process is essentially a hydride (H^-) transfer reaction. In the realm of synthetic organic chemistry, the structurally similar 1,4-dihydropyridine (1,4-DHP) or Hantzsch ester has emerged as a promising hydride source in its ground state, commonly used in catalytic hydrogenation reactions.[3] Recent research has unveiled its potential to act as a strong photoreductant or as a source of hydrogen atoms via a single electron transfer (SET) process when exposed to visible light.[4]

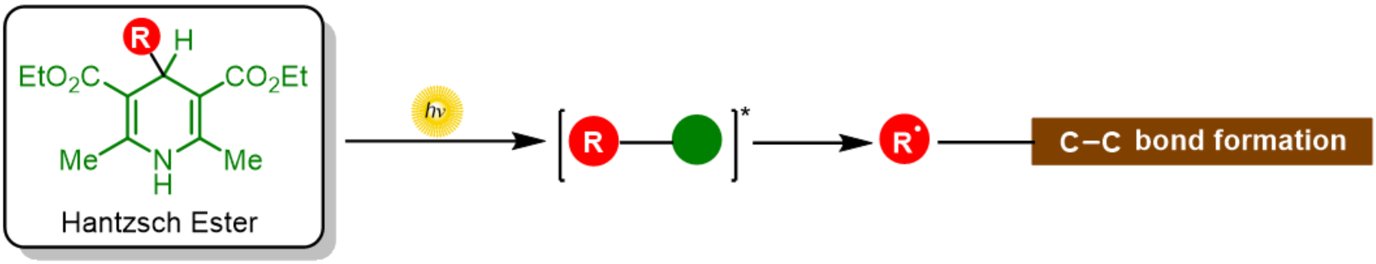


Figure 1. Graphical abstract of the generation of radicals from Hantzsch Ester

Moreover, structurally resemble, 4-alkyl-1,4-DHPs, in its excited state can act as a source of alkyl radicals without the need for any photocatalyst, and the resulting radicals can be further utilized to form C-C bonds. Inspired by the groundbreaking work of Melchiorre, Nishibayashi, and others,[5,6] our group has also demonstrated C(sp3)-C(sp3) cross-coupling using these 4-alkyl-1,4-DHPs.[7] The focus of this talk will primarily center on the potential of these DHPs to reduce challenging molecules or to leverage the generated alkyl radicals to create diverse molecular complexity.

References

1. (a) Balzani, V.; Ceroni, P.; Juris, A. *Wiley-VCH, Weinheim*, **2014**. (b) Klan, P.; Jacob, J.; *Wiley, Hoboken*, **2010**.
2. (a)Albini, A.; Fagnoni, M. *Wiley-VCH, Weinheim*, **2010**. (b) Turro, N. J.; Ramamurthy, V.; Scaiano, J. C. *University Science Books, Sausalito, CA*, **2010**.
3. (a) Zheng, C.; You, S.-L. *Chem. Soc. Rev*. **2012**, *41*, 2498−2518. (b) Wang, P.-Z.; Chen, J.-R.; Xiao, W. *J. Org. Biomol. Chem*. **2019**, *17*, 6936−6951. (c) Suresh Yedase, G.; Venugopal, S.; P, A.; Reddy Yatham, V. *Asian J. Org. Chem*. **2022**, *11*, No. e202200478.

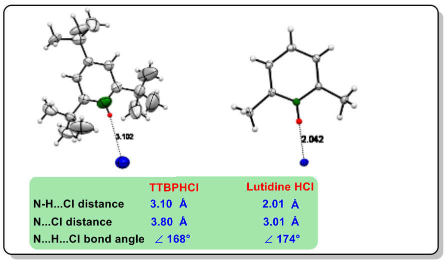
Dr. Pavan K. Kancharla
Associate Professor
Indian Institute of Technology Guwahati
Guwahati, Assam
INDIA-781039
E-Mail: pavankancharla@iitg.ac.in
Homepage: https://pavankancharla.wixsite.com/pk-lab

Dr. Kancharla has obtained his Ph.D. from Indian Institute of Technology Kanpur under the supervision of Prof. Y. D. Vankar. He subsequently moved to Prof. David Crich's laboratory for a two year postdoctoral stint at Wayne State University followed by another two years with Prof. Linda Hsieh-Wilson at Caltech. With the experience gained from all these pioneering laboratories in carbohydrate chemistry, he started his independent career at Indian Institute of Technology Guwahati to trying a establish a carbohydrate laboratory in the North eastern part of India. His research is mainly focussed on the development of organocatalytic methods for the stereoselective glycosylation. Some of his notable contributions are strained/frustrated Bronsted pair catalysis by sterically hindered pyridinium salts, iminium catalysed glycosylation, and the development of catalytically active alkene (PMPVB) based donors as stable, yet reactive donors.

Frustrated Bronsted Pair Catalysis for Carbohydrate Chemistry and Beyond

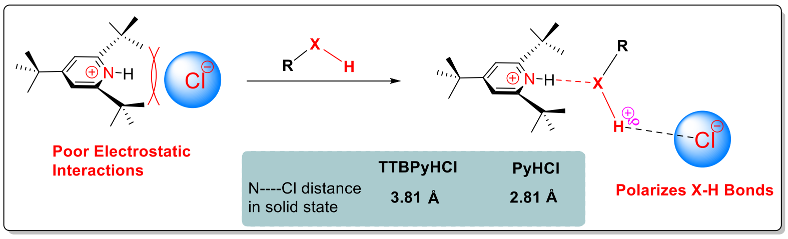
Dr. Pavan K. Kancharla

Indian Institute of Technology Guwahati
Email: pavankancharla@iitg.ac.in



	TTBPHCl	Lutidine HCl
N-H...Cl distance	3.10 Å	2.01 Å
N...Cl distance	3.80 Å	3.01 Å
N...H...Cl bond angle	∠ 168°	∠ 174°

Sterically hindered 2,4,6-tri-*tert*-butylpyridine (TTBPy) is in general used as a proton trapping agent in organic chemistry including carbohydrate chemistry to trap the released strong acids in the reactions. We, in our laboratory, however, for the first time have shown that the salts of the sterically hindered pyridinium salt possesses some unique properties and can catalyse a variety of glycosylation reactions with great stereocontrol. Interestingly, the analysis of the single crystal X-ray structure of the Bronsted pair TTBPyHCl led to the observation that NH...Cl distance is 3.10 Å (Figure 1) is significantly longer (more than 1 Å longer) than in the analogous, albeit less bulky lutidine.HCl in which the NH...Cl distance is 2.01 Å and is beyond any H-bonding interaction. We hypothesized that the increased separation by almost > 1 Å from the distance of minimum energy in between the ion-pair (or Bronsted pair), and results in a certain amount of strain or frustration and may imbue an increased reactivity in both the ions and more so may induce a certain degree of nakedness and high reactivity to the highly coordinating anion like chloride (Frustrated Bronsted pair activity) akin to the frustrated Lewis pairs (FLP). Besides, the N-H...Cl bond angle that should be linear is also deviated to a great extent in the case of the bulky TTBPyHCl to 168°.



	TTBPyHCl	PyHCl
N----Cl distance in solid state	3.81 Å	2.81 Å

References

1. Pradhan, P.; Biswas, A.; Rotta, M. K. V. Kancharla, P. K. *Org. Lett.* **2024**, ASAP.
2. Addanki, R. B.; Moktan, S.; Halder, S.; Sharma, M.; Sarmah, B. K., Bhattachary, K. Kancharla, P. K. *J. Org. Chem.* **2024**, *89*, 3713.
3. Mukherji, A.; Kancharla, P. K. *Synlett.* **2022**, 33, A-F.
4. Addanki, R. B.; Halder, S. H.; Kancharla, P. K. *Org. Lett.* **2022**, *24*, 1465-1470.
5. Mukherji, A.; Addanki, R. B.; Halder, S. H.; Kancharla, P. K. *J. Org. Chem.* **2021**, *86*, 17226.
6. Mukherji, A.; Kancharla, P. K. *Org. Lett.* **2020**, *22*, 2191–2195.
7. Ghosh, T.; Mukherji, A.; Kancharla, P. K. *Org. Lett.* **2019**, *21*, 3490–3495

Scott A. Snyder
Professor of Chemistry
Deputy Dean of the College and the Physical Sciences Division
University of Chicago
Chicago, IL 60637
E-Mail: sasnyder@uchicago.edu
Homepage: https://snyder-group.uchicago.edu/

Scott grew up in Buffalo, NY, where his interests in science, particularly chemistry, were forged by a variety of experiences including an opportunity in high school to attend the United States National Study Camp for the International Chemistry Olympiad. Scott pursued his undergraduate studies at Williams College in Williamstown, MA where he graduated as valedictorian, and in 1999 began his graduate studies with Professor K. C. Nicolaou at The Scripps Research Institute in La Jolla, CA where he was fully funded by graduate fellowships from the National Science Foundation, Pfizer, and Bristol-Myers Squibb; in addition to his benchwork he also co-authored the advanced text *Classics in Total Synthesis II* (Wiley-VCH). He was then an NIH postdoctoral fellow at Harvard University with Prof. E. J. Corey, before starting his independent career at Columbia University in 2006. After being promoted to Associate Professor of Chemistry in June of 2011, Scott moved to Jupiter, FL campus of The Scripps Research Institute in September of 2013 as an Associate Professor of Chemistry and was recruited by the University of Chicago as a Full Professor in September of 2015.

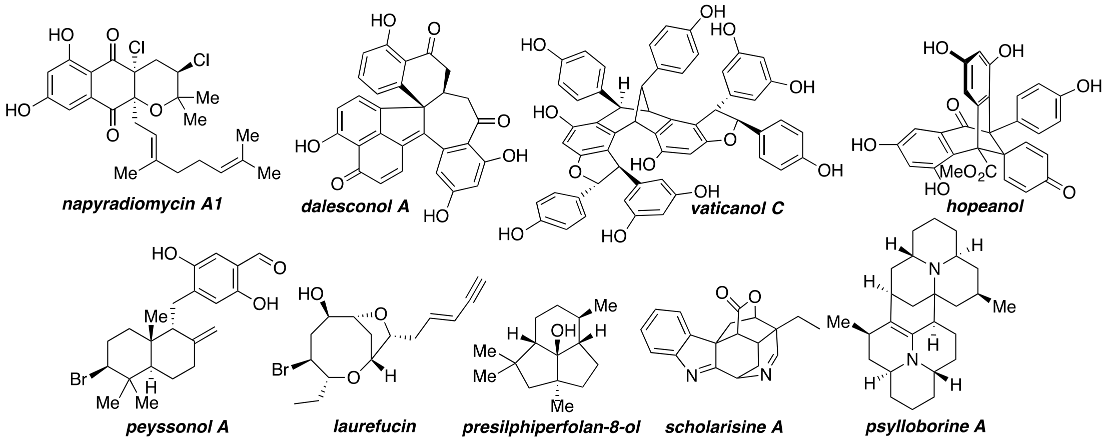
His research interests are devoted to the synthesis of natural products, particularly those of the terpene, polyphenol, and alkaloid classes, seeking to identify new strategies and tactics of broad significance to prepare them in a laboratory setting and then explore their biochemical potential with collaborators. In addition, Scott and his group have developed a unique group of halogenating reagents that are used in both academia and industry, with one sold by Sigma-Aldrich to create natural and designed compounds. Overall, Scott has trained more than 150 scientists in his laboratory from the high school through postdoctoral levels, and has delivered more than 250 lectures on his research to date in nearly 20 countries. He is dedicated to chemical education in its broadest sense as denoted by a STAR Award (2021) and a Cottrell Scholar Award (2009) from the Research Corporation for Science Advancement. Scott is also helping to shape the face of undergraduate education worldwide as co-author (with T. W. G. Solomons and C. B. Fryhle) of the 11th and 12th editions of *Organic Chemistry* (Wiley). Recent awards and honors include the Stuart and Marian Rice Research Award (2024), a Swiss Chemical Society Lectureship (2017), and a Quantrell Award for Excellence in Undergraduate Teaching at the University of Chicago (2017).

Strategies for the Rapid Synthesis of Molecular Complexity

Scott A. Snyder

University of Chicago, Department of Chemistry, Chicago, IL 60637 (USA)
E-mail: sasnyder@uchicago.edu

The total synthesis of natural products has long served as a principal driving force for discovering new chemical reactivity, evaluating physical organic theories, testing the power of existing synthetic methods, and enabling biology and medicine. Research in our group continues in that tradition, with efforts focused on developing reactions, reagents, and strategies to rapidly assemble entire collections of natural products in hopes of gaining a fuller understanding of their biochemical potential. Over the past decade, these efforts have afforded access to numerous classes of compounds, including halogenated materials, diverse polycyclic and stereochemically dense alkaloids, non-functionalized terpenes, and oligomeric polyphenols.[1-5] This talk will present recent advances and discoveries, focused particularly on structurally unique terpene targets.



References

1. F. Salahi, C. Yao, J. R. Norton, S. A. Snyder. The Synthesis of Diverse Terpene Architectures from Phenols. *Nature: Synthesis* **2022**, *1*, 313.
2. V. G. Lisnyak, S. A. Snyder. A Concise, Enantiospecific Total Synthesis of Chilocorine C Fueled by a Reductive Cyclization/Mannich Reaction Cascade. *J. Am. Chem. Soc.* **2020**, *142*, 12027.
3. C. Peng, P. Arya, Z. Zhou, S. A. Snyder. A Concise Total Synthesis of (+)-Waihoensene Guided by Quaternary Center Analysis. *Angew. Chem. Int Ed.* **2020**, *59*, 13521.
4. P. Hu, H. M. Chi, K. C. DeBacker, X. Gong, J. H. Keim, I. T. Hsu, S. A. Snyder. Quaternary Centre-Guided Synthesis of Polycyclic Terpenes. *Nature* **2019**, *569*, 703.
5. P. Hu, S. A. Snyder. Enantiospecific Total Synthesis of the Highly Strained (−)-Presilphiperfolan-8-ol via a Pd-Catalyzed Tandem Cyclization. *J. Am. Chem. Soc*. **2017**, *139*, 5007.

4. (a) Fukuzumi, S.; Hironaka, K.; Tanaka, T. *J. Am. Chem. Soc*. **1983**, *105*, 4722–4727; (b) Jung, J; Kim, J.; Park, G.; You, Y.; Cho, E. J.; *Adv. Synth. Catal*. **2016**, *358*, 74–80; (c) Emmanuel, M. A.; Greenberg, N. R.; Oblinsky, D. G.; Hyster, T. K.; *Nature* **2016**, *540*, 414–417.
5. Buzzetti, L.; Prieto, A.; Roy, R. S.; Melchiorre, P. *ACS Catal*. **2018**, *8*, 1062-1066.
6. (a) Verrier, C.; Alandini, N.; Pezzetta, C.; Moliterno, M.; Buzzetti, L.; Hepburn, H. B.; Vega-Peñaloza, A.; Silvi, M.; Melchiorre, P. *Catalysis ACS Catal*. **2018**, *8*, 1062−1066. (b) Zhang, Y.; Tanabe, Y.; Kuriyama, S. K.; Nishibayashi, Y.; *Nature Communications* **2023**, *14*, 859.
7. Patel, S.; Chakraborty, A.; Chatterjee, I. *Org. Lett.***2023**, *25*, 8246–8251.

Astra Zeneca Session;
Chairpersons: Swapnil Yerande and Diwan Rawat

Shū Kobayashi
Professor
The University of Tokyo
Tokyo, JAPAN
E-Mail: shu_kobayashi@chem.s.u-tokyo.ac.jp
Homepage: https://www.chem.s.u-tokyo.ac.jp/users/synorg/en/index.html

Prof. Shū Kobayashi studied at The University of Tokyo, receiving his Ph.D. in 1988 working under the direction of Professor T. Mukaiyama. Following an initial period as assistant professor, he was promoted to lecturer then associate professor at Science University of Tokyo (SUT). In 1998, he moved to the Graduate School of Pharmaceutical Sciences, The University of Tokyo, as full professor. In 2007, he was appointed to his current position as professor of organic chemistry in the Department of Chemistry, Faculty of Science, The University of Tokyo. He held various visiting professorships, including the Universite Louis Pasteur, Strasbourg (1993), Kyoto University (1995), Nijmegen University (1996), Philipps-University of Marburg (1997), Paris-Sud (2010), and ESPCI (2016).

He has wide-ranging research interests that include the development of new synthetic methods and novel catalysts, organic reactions in water, solid-phase and flow synthesis, total synthesis of biologically interesting compounds, and organometallic chemistry. He has held numerous named lectureships and is a recipient of many prestigious awards, including the Chemical Society of Japan Award for Young Chemists (1991), Springer Award in Organometallic Chemistry (1997), IBM Science Award (2001), Organic Reactions Lecturer (2002), Nagoya Silver Medal (2002), Mitsui Chemical Catalysis Science Award (2005), JSPS Prize (2005), the Arthur C. Cope Scholar Award from the American Chemical Society (2006), Howard Memorial Lecturer (2006), C.S. Hamilton Award (2006), Merck-Cambridge Lecturer (2007), Boehringer Ingelheim Lecturer (2009), Humboldt Research Award (2013), Green Chemistry Minister of Education Award (2013), Green Chemistry Minister of Education Award (2013), Honorary Professor, Wuhan Institute of Technology (2013), TUM-IAS Honorary Hans Fischer Senior Fellow (2013), Honorary Professor, Wuhan University of Technology (2014), Association for the Advancement of Science(AAAS) Fellow (2015), Toray Science and Technology Prize (2016), Honorary Professor, Hebei Engineering University (2016), Negishi Award (2018), Chemical Society of Japan Award (2019), The T.-Y. Luh Lectureship Award (2019), and The Medal of Honor with Purple Ribbon (2020 Autumn), BCSJ Award Article from The Chemical Society of Japan(2023).

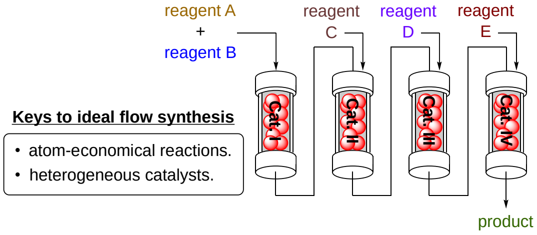
Flow Methods for Organic Synthesis Toward a Sustainable Society

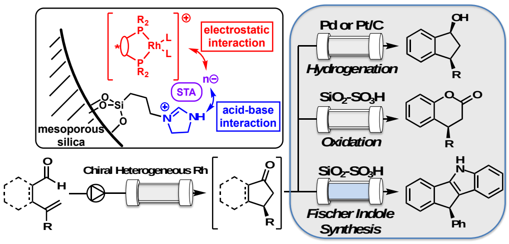
Shū Kobayashi

Department of Chemistry, School of Science, The University of Tokyo, Bunkyo-ku, Tokyo 113-0033, Japan
Email: shu_kobayashi@chem.s.u-tokyo.ac.jp

Toward a sustainable society, one of the ideal approaches to fine chemical synthesis is based on sequential-flow synthesis. In this method, materials are successively flowed through columns packed with heterogeneous catalysts, which are connected according to the planned synthetic route. Ideally, separation and purification steps are eliminated until the final product is obtained from the continuous flow process. To achieve this, continuous-flow synthesis should utilize atom-economical organic transformations, particularly addition and condensation reactions, catalyzed by heterogeneous catalysts.

We have developed heterogeneous chiral catalysts based on acid-base and electrostatic interactions. These robust catalysts exhibit high activity and selectivity in various continuous-flow asymmetric reactions, affording optically active compounds without leaching of metal species. The chiral environments can be readily tuned by changing chiral ligands, demonstrating the high versatility of these heterogeneous catalysts. By applying these efficient catalysts, we have achieved the continuous synthesis of several active pharmaceutical ingredient (API) intermediates.





References

1. T. Tsubogo, H. Oyamada, S. Kobayashi, *Nature* **2015**, *520*, 329.
2. W.-J. Yoo, H. Ishitani, Y. Saito, B. Laroche, S. Kobayashi, *J. Org. Chem.* **2020**, *85*, 5132.
3. Y. Saito, S. Kobayashi, *J. Am. Chem. Soc.* **2020**, *142*, 16546.
4. Y. Saito, S. Kobayashi, *Angew. Chem. Int. Ed.* **2021**, *60*, 26566.
5. Y. Yamashita, Y. Ogasawara, T. Banik, S. Kobayashi, *J. Am. Chem. Soc.* **2023**, *145*, 23160.
6. Y. Saito, S. Kobayashi, *Angew. Chem. Int. Ed.* **2023** e202313778.
7. Y. Saito, Y. Sato, S. Kobayashi, *ACS Catal.* **2024**, *14*, 2202.
8. Y. Saito, T. Konno, S. Kobayashi, *Green Chem.* **2024**, *26*, 8680.

Vidya Ramadas, PhD
Asst. Vice President
Department of Medicinal Chemistry
Enveda Biosciences, Genome Valley, Hyderabad
Contact Number: 9545454665
E-mail: vidya.ramadas@envedabio.com; vidya605@yahoo.co.in
https://www.linkedin.com/in/vidya-ramadas-781b679/

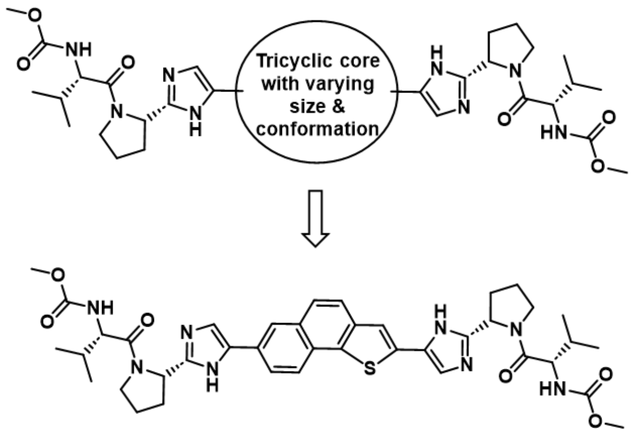
Vidya Ramadas has more than twenty years of experience in Medicinal Chemistry and Novel Drug Discovery. She obtained her PhD in synthetic organic chemistry from Univ of Hyderabad with Prof. Goverdhan Mehta and gained her post-doctoral experience at Univ of Kansas, USA with Prof. Gunda I Georg. After her post-doctoral research, she had opportunity to work in the drug discovery set-up of three different Indian pharmaceutical companies, Dr. Reddy’s Laboratories, TATA-Advinus Therapeutics and Lupin Ltd. She worked on different disease targets under various therapeutic areas such as metabolic disorder, anti-inflammation, pain, anti-viral and oncology and delivered several pre-clinical candidates suitable for clinical development as a medicinal chemistry project leader. Over the years she has developed skills in novel drug design, structure-activity relationship analysis, lead optimization, patent analysis and IP generation. She is a co-author to 19 publications and co-inventor in 17 WO patents and ten are granted in US. Although, she enjoyed her teaching experience in academic set up for 18 months at IIT Jammu, she decided to come back to industry to pursue her passion for drug discovery and joined Enveda Biosciences in Sep 2022. Currently, she is working as Assistant Vice President in medicinal chemistry department at Enveda Biosciences, Hyderabad.

Discovery of Drugs for Hepatitis C: A Race Against Time & Key Learnings

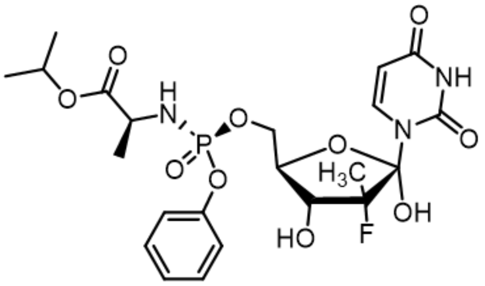
Vidya Ramadas

Enveda Biosciences, Genome Valley, Hyderabad
Email: vidya.ramadas@envedabio.com

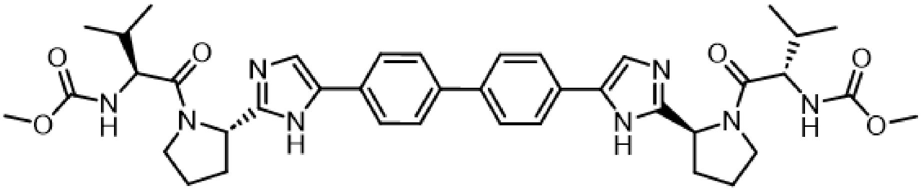
One of the important medical advances of 21st century was a cure for hepatitis C and Hepatitis C Virus infection became the first curable chronic viral infection. Almost 22 years after the discovery of the hepatitis C virus, the first two direct acting anti-viral drugs became available in 2011 and this led to a wave of drug approvals in next few years and a revolution in hepatitis C therapy. This talk will cover the evolution of new drugs from non-oral standard of care peg-IFN-RBV for 72 weeks with 40% sustained virological response rate for genotype 1 to completely oral, pan-genotypic, direct acting anti-viral drugs for 8 weeks with >98% sustained virological response and a complete cure. Also, how, in the race of a decade, many lost, some withdrawn, some won, and some overtook phenomenally including our own efforts at Lupin will be discussed.



IC_{50} (pM): GT1b =12, GT2a =5, GT3a =47, GT4a =3



Sofosbuvir (Sovaldi), 2013, Gilead
Wonder drug, HCV NS5B inhibitor



Daclatasvir (Daklinza), 2015, BMS
Pan genotypic, HCV NS5A inhibitor

Our discovery at Lupin
Pan genotypic, HCV NS5A inhibitor

References

1. Breakthroughs in hepatitis C research: from discovery to cure, Michael P. Manns and Benjamin Maasoumy, *Nature Reviews*, 2022, *19*, 533
2. Direct-Acting Antiviral Agents for Hepatitis C Virus Infection—From Drug Discovery to Successful Implementation in Clinical Practice, Christopher Dietz and Benjamin Maasoumy, *Viruses*, 2022, *14*, 1325
3. Discovery and Characterization of Potent Pan-Genotypic HCV NS5A Inhibitors Containing Novel Tricyclic Central Core Leading to Clinical Candidate, *J. Med. Chem.*, 2019, *62*, 10563

Chada Raji Reddy
Chief Scientist
CSIR-IICT Hyderabad
Hyderabad, INDIA
E-mail: rajireddy@iict.res.in
Homepage: https://rajireddy9.wixsite.com/my-site2

Dr. Raji Reddy received his Ph.D. CSIR-IICT, Hyderabad (Osmania University) in 2002, followed by a post-doctoral stay at University of South Florida, Tampa, USA (2002) and subsequently to University of Mississippi, USA (2002-2005). He returned India in 2005 and joined as a principal scientist in Sai Life Sciences, Hyderabad. Later in 2006, he joined CSIR-IICT, Hyderabad as a scientist at the Department of Organic Synthesis & Process Chemistry and presently working as a Chief Scientist.

His research interests are both fundamental and applied research, include (i) the chemistry of propargylic alcohols and propiolamides; (jj) enyne-assisted annulation reactions, *ipso*-annulations and synthesis of bio-active natural products; (iii) Process development of APIs. Representative accomplishments are: processes for Favipiravir, Remdesivir, (*S*)-Pregabalin, key fragment of Eribulin mesylate and TLR 7/8 agonist molecule, used as an adjuvant in COVAXIN® (COVID-19 vaccine) have been developed and transferred to pharmaceutical organizations.

He is a Fellow of National Academy of Sciences (FNASc) and Telangana Academy of Sciences (FTAS). He is a recipient of CSIR-Technology Award-2021, NASI-Reliance Industries Platinum Jubilee Award-2020, CSIR-Technology Award-2020, CRSI Bronze Medal-2018, CDRI–Drug Research Excellence Award-2017, Dr. A K Singh Memorial-Young scientist award-2014, AVRA-Young scientist award-2011 and A P Akademi-Young scientist award-2007.

He is an author of 178-publications, 15-patents, 3-review articles and 2-book chapters. Under his supervision 35-Students have been awarded Ph. D. degree. Presently, 12-research fellows are working for their Ph. D.

Cascade Functionalization/Annulation of Enyne Precursors

Dr. Chada Raji Reddy

CSIR-Indian Institute of Chemical Technology
Email: rajireddy@iict.res.in

The substrates having alkene (ene) and alkyne (yne) functionalities are handy precursors for the synthesis various heterocyclic as well as carbocyclic frameworks through various annulation approaches.[1] Hence, the preparation of these enyne substrates from easily accessible starting materials and their conversion in to the desired heterocycles or carbocycles is an important reaction(s) in organic synthesis. We found that propargylic alcohols (MBH-adducts of propiolaldehydes) are suitable substrates for the afore- mentioned reactions.[2] Our studies on enyne-assisted cascade functionalization/annulation reactions and utilization of functionalized enynes as useful synthons, led to diversely functionalized heterocycles/carbocycles.[3] The present lecture will focus on the recent accomplishments of these studies towards the construction of cyclopentenones, pyridine-*N*-oxides and others (Figure 1).[4]

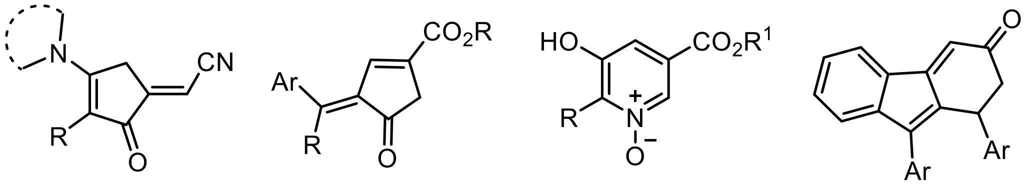


Figure 1: Representative structures

References

1. (a) Liu, J.-X.; Xu, S.-Q.; Han, Y.-P.; Liang, Y.-M. *Adv. Synth. Catal*. **2024**, *366*, 1220 (b) Xuan, J.; Studer, A. *Chem. Soc. Rev.* **2017**, *46*, 4329.
2. (a) Reddy, C. R; Patil, A. D.; Mohammed S. Z. *Chem. Commun.* **2020***, 56,* 7191 (b) Reddy, C. R; Mallesh, K; Srinivas, B; Donthiri, R. D. *J. Org. Chem*. **2020**, *85*, 7905 (c) Reddy, C. R; Reddy, M. D.; Srikanth, B.; Prasad, K. R. *Org. Biomol. Chem*. **2011**, *9*, 6027
3. (a) Reddy, C. R; Patil, A. D. *Org. Lett*. **2021**, *23*, 4749 (b) Reddy, C. R.; Panda, S. A.; Reddy, M. D. *Org. Lett.*, **2015**, *17*, 896 (c) Reddy, C. R.; Prajapati, S. K.; Ranjan, R. *Org. Lett.* **2018**, *20*, 3128
4. (a) Reddy, C. R.; Ganesh, V.; Punna, N. *Chem. Commun*., **2023**, *59*, 8600 (b) Reddy, C. R.; Subhash, B.; Ganesh, V. *Org. Chem. front*., **2025**, *(under revision)* (c) Reddy, C. R.; Ajaykumar, U.; Ganesh, V. *(communicated)* (d) Reddy, C. R; Kumari, A.; Vijendar, A. (*to be communicated*)

Suman De Sarkar
Professor
IISER Kolkata
Department of Chemical Sciences
Mohanpur-741246, West Bengal, India
E-mail: sds@iiserkol.ac.in
Homepage: https://www.redoxlab.in/

Suman De Sarkar received B.Sc. (2005) and M.Sc. (2007) degrees in Chemistry from University of Calcutta and IIT Kanpur, respectively. He obtained his Ph.D. in November 2010 from University of Muenster under the supervision of Prof. Armido Studer. Afterward, he worked as a postdoctoral researcher in the research group of Prof. Karl Gademann at the University of Basel (2011-2013) and with Prof. Lutz Ackermann as an Alexander von Humboldt Postdoctoral Fellow at the University of Goettingen (2013-2015). In October 2015, he joined IISER Kolkata as an Assistant Professor and, in January 2025, was promoted to the post of Professor. His research interests are the application of redox-mediated transformations in organic synthesis with a special focus on electrochemistry and photocatalysis.

Selected Publications:

1. T. Mandal, S. Mallick, M. Islam, **S. De Sarkar***, *ACS Catal.* **2024**, *14*, 13451.
2. S. K. Saha, S. Mallick, A. Nath, **S. De Sarkar***, *Org. Lett.* **2024**, *26*, 7330.
3. M. Baidya, D. Maiti, L. Roy*, **S. De Sarkar***, *Angew. Chem., Int. Ed.* **2022**, *61*, e202111679.
4. D. Maiti, K. Mahanty, **S. De Sarkar***, *Org. Lett.* **2021**, *23*, 1742.
5. **S. De Sarkar***, *Angew. Chem., Int. Ed.* **2016**, *55*, 10558.

Awards/Achievements:

- CRSI Bronze Medal **2025**
- Editorial Board member of Tetrahedron & Tetrahedron Letters **2024**
- Member of the Early Career Advisory Board of Asian Journal of Organic Chemistry
- Thieme Chemistry Journals Award 2023
- Fellow of the Indian Chemical Society
- DSM Science & Technology Award, Netherlands (**2011**)
- D. C. Mukherjee Gold Medal Award (**2005**)

Regulating Chemoselectivity through Controlled Electrolysis

Suman De Sarkar

Department of Chemical Sciences
Indian Institute of Science Education and Research Kolkata
Mohanpur-741246, West Bengal, India
Email: sds@iiserkol.ac.in

Chemoselectivity is a critical concept in organic synthesis, where precise control over the reactions occurring at different functional groups is essential.[1] In the first part of the talk, a regio-divergent synthetic approach to access highly substituted indole scaffolds will be illustrated. The developed tuneable electrochemical strategy exploits two analogous styrylaniline precursors and permits nice control on the chemoselectivity over the C-3 substitution pattern, governed by the acidity of the amide proton.[2] A follow-up formal [3+2] cycloaddition strategy between α-amino carbonyls and tosylmethyl isocyanide (TosMIC) will be depicted, permitting the fabrication of 1,5-disubstituted imidazole derivatives.[3] Next, an electrochemical heterocoupling between two *N*-aryl glycinate derivatives will be presented, which provides highly stereoselective 4,5-dihydro-1*H*-imidazole carboxylates. Finally, a switchable regioselective $C(sp^2)$-H/$C(sp^3)$-H arylation leading to highly substituted carbazole manifolds or substituted glycinate derivatives will be demonstrated.[4]

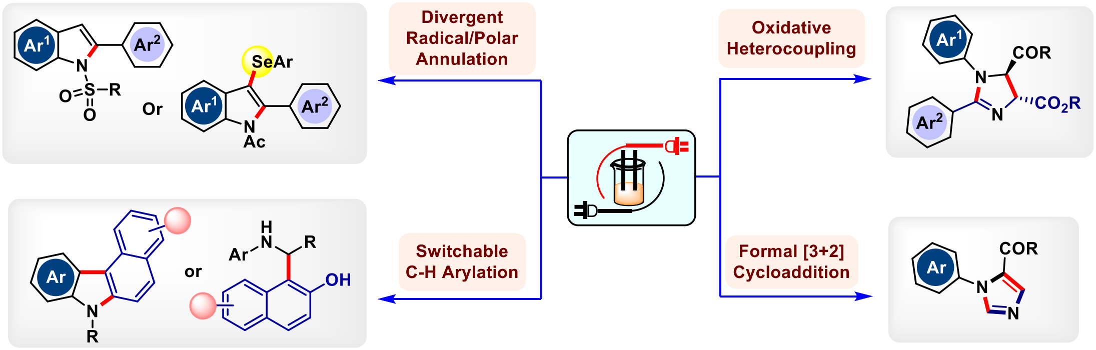


Figure 1. Chemoselective synthesis of various heterocycles through controlled electrolysis

References

1. R. A. Shenvi, D. P. O'Malley, P. S. Baran, *Acc. Chem. Res*. **2009**, *42*, 530-541.
2. (a) M. Baidya, D. Maiti, L. Roy, S. De Sarkar, *Angew. Chem., Int. Ed.* **2022**, *61*, e202111679. (b) S. Mallick, T. Mandal, N. Kumari, L. Roy, S. De Sarkar, *Chem. Eur. J.* **2024**, *30*, e202304002.
3. S. Mallick, D. Das, S. De Sarkar, *unpublished*.
4. S. Mallick, P. Bhardwaj, L. Roy, S. De Sarkar, *unpublished*.

Dr. Indubhusan Deb
Senior Principal Scientist
Organic and Medicinal Chemistry Division
CSIR-Indian Institute of Chemical Biology-Kolkata
E-Mail:
indubhusandeb@iicb.res.in.indubhusandeb@gmail.com
Group webpage:
https://debchemgroup.wixsite.com/mysite/pi
https://iicb.res.in/faculty/indu-bhusan-deb

Dr. Indu Bhusan Deb completed his M.Sc. in Organic Chemistry from Banaras Hindu University (BHU). He earned his Ph.D. in 2008 at the Indian Institute of Technology Bombay (IITB) under the supervision of Professor I. N. N. Namboothiri. Following this, he pursued postdoctoral research at Rutgers University, USA, with Professor Daniel Seidel, focusing on the synthesis of chiral heterocycles.

After three years at Rutgers, he joined Professor Naohiko Yoshikai's research group at Nanyang Technological University (NTU), Singapore, for his second postdoctoral tenure. In April 2013, Dr. Deb became a Research Investigator (Project Leader) in the Process Chemistry Division at Bristol-Myers Squibb Research Center, Bangalore.

In January 2014, he joined the Organic and Medicinal Chemistry Division at CSIR-IICB as a Senior Scientist. He became a Principal Scientist in 2018 and has been serving as a Senior Principal Scientist in the same division since 2022. He also holds the position of Professor at the Academy of Scientific and Innovative Research (AcSIR).

Research Interests: Dr. Deb's research group has substantially contributed in the field of catalysis in the organic chemistry area (electrochemical synthesis/C-H bond activation/functionalization) to develop efficient, and innovative processes for the synthesis of functionalized potential bio-active molecules

Dr. Deb's research group is dedicated to developing novel methods in asymmetric synthesis and synthetic methodology, including transition-metal–catalyzed C–H bond activation chemistry, metal-free reactions, and organo-electrosynthesis. His work is aimed at the synthesis of potential bioactive small molecules.

Access to Functionalized N-Heterocycles via Electrochemical Synthesis and Annulation Reactions

Dr. Indubhusan Deb

Organic and Medicinal Chemistry Division, CSIR-Indian Institute of Chemical Biology,
4, Raja S. C. Mullick Road, Kolkata 700032
Email: indubhusandeb@iicb.res.in

The ubiquitousness of dibenzoxazepines, benzazepines, benzoxazine, benzosultam, acridines in various natural products and pharmaceuticals make them immensely valuable scaffolds. Hence, the development of new and efficient methods for their synthesis and derivatization assumes high significance. Recently, we have developed several efficient and mild methodologies via direct and selective C-H functionalization employing the electrochemical, metal-catalyzed, and spiro-annulation reactions for synthesizing densely functionalized potential bioactive heterocycles, which will be discussed during the presentation.[1-11]

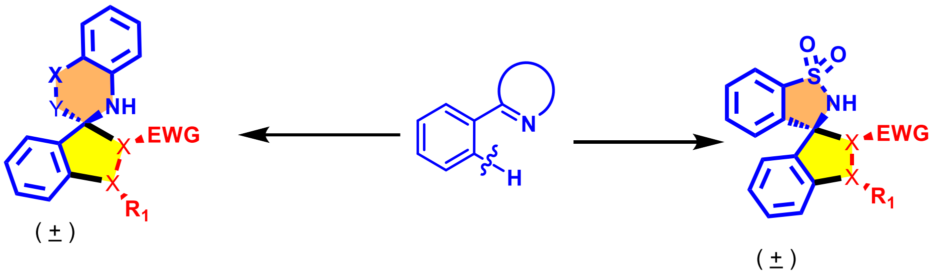


Figure 1: Annulation reactions

References

1. Mondal, I.; Naskar, K.; Roy, S.; Purkait, A. and Deb , I. *Org. Lett.* 2024, **26,** 9859-9864
2. Mondal, I.; Roy, S.; NAskar, K.; Karmakar, S.; Chowdhury, M. and Deb , I. *Org. Lett.* 2023, **25,** 8199-8204
3. Bhowmik, A.; Naskar, K.; Roy, S.; Karmar, S.; Sarkar, W.; Mondal, I.; Sana A.; Deb, I. *Chem. Commun*.2023, **59,**13899-13902
4. Roy, S.; Karmakar, S.; Mondal, I.; Naskar, K.; Sarkar, W.; Deb, I. *Chem. Commun*.2023, **59,**9074-9077
5. Naskar, K.; Karmakar, S.; Mandal, I.; Sarkar, W.; Roy, S.; Roy, A.; Deb, I. *Chem. Commun*.2023, **59**,7751-7754
6. Das, S.; Roy, S.; Bhowmik, A.; Sarkar, W.; Mandal I.Deb, I. *Chem. Commun*.2022, **58**,2902-2905
7. Sarkar, W.; Bhowmik, A.; Mishra, A.; Deb, I. *Org. Lett.* 2021, **23,** 4521-4526
8. Mishra, A.; Bhowmik, A.; Samanta, S.; Sarkar, W.; Das, S.; Deb, I. *Org. Lett.* 2020, 22, 1340-1344
9. Mishra, A.; Mukherjee, U.; Sarkar, W.; Medhuri, S.; Bhowmik, A.; Deb, I. *Org. Lett.* 2019, **21,** 2056-2059
10. PATENT: 0163NF2021, 202111047806. PCT/IN2022/050940, 20 Oct 2022.
11. PATENT: 0211NF2020; 202111047809. PCT/IN2022/050931, 19 Oct 2022.

Cipla Session;

Chairpersons: Stellios Arseniyadis and Rajib Goswami

Alexandros L. Zografos
Professor
Aristotle University of Thessaloniki
Thessaloniki, GREECE
E-Mail: alzograf@chem.auth.gr
Homepage: https://alzograf.webpages.auth.gr/

Alexandros L. Zografos graduated as a chemist in 1996 from National University of Athens. After earning his PhD in 2001 under the supervision of Prof. Olga Igglessi-Markopoulou at National Technical University of Athens, he pursued postdoctoral studies first at The Scripps Research Institute, under the guidance of Prof. Phil S. Baran and then at Columbia University with Prof. Scott Snyder, before moving back to Greece to work as a senior researcher at National University of Athens and at NCRS Demokritos Institute. In 2009, he began his independent career at Aristotle University of Thessaloniki where currently he is Professor of Organic Chemistry. He is recipient of Hildegrad award of the National Academy of Athens and the Fulbright Visiting Scholar Award. His group is working on the exploration of divergent total synthesis of natural products and the development of biomimetic methodologies for the aerobic oxidation of complex substrates. He has more than 60 publications with more than 2500 citations. 10 students have been already awarded Ph. D. degree under his guidance.

Simplifying biosynthesis: how to access the natural complexity of sesquiterpenoids following easy steps

Prof. Alexandros L. Zografos

Aristotle University of Thessaloniki
Email: alzograf@chem.auth.gr

The growing need for potent and selective biomodulators to address contemporary health challenges underscores the importance of innovative synthetic strategies. Divergent synthesis, which harnesses common synthetic scaffolds to generate a diverse array of natural product-like compounds, is emerging as a powerful tool in modern drug discovery. Inspired by nature's unparalleled efficiency, as demonstrated by the biosynthesis of terpenoids, divergent synthesis mimics the complexity and selectivity of enzymatic transformations. Nature's biosynthetic pathways, particularly the terpenoid synthesis, involve simple scaffold formation in the cyclase phase, followed by intricate functionalization through oxidative enzymes in the oxidase phase. This model reveals how nature iteratively applies fundamental metabolic reactions to generate highly complex and functional carbocyclic frameworks.

By identifying and emulating these biosynthetic principles, modern total synthesis can integrate selective, biosynthetic-like reactions, offering a sustainable and efficient approach to drug discovery. This presentation will explore cutting-edge approaches to developing a unified synthetic strategy, focusing on the creation of highly cytotoxic sesquiterpene lactones, inspired by nature's two-phase biosynthesis.

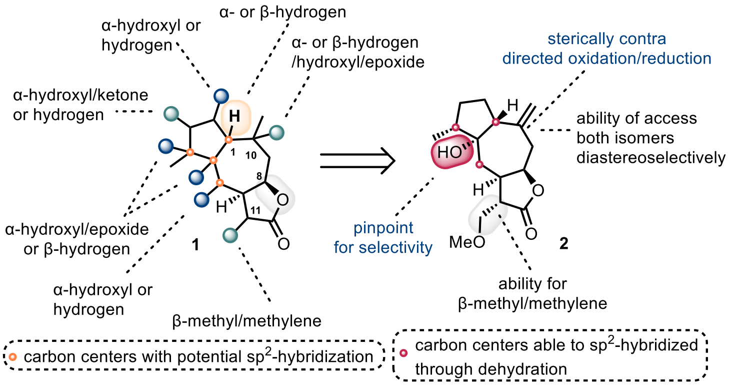


Figure 1: Building diversity in sesquiterpenoids

References

1. V. P. Demertzidou, M. Kourgiantaki, A. L.Zografos, *Org. Biomol. Chem.* **2021**, *19*, 8687−8690.
2. V. P. Demertzidou, M. Kourgiantaki, A. L. Zografos *Org. Lett.* **2024**, *26*, 4648−4653.
3. K. Mazaraki, C. Zangelidis,; A. Kelesidis, A. L. Zografos, *Org. Lett*. **2024**, *26*, 11085−11089.
4. K. Gennaiou, A. Kelesidis, A. L. Zografos, *Org. Lett.* 2024, *26*, 2934−2938.

G. Sekar
Professor and Head
Department of Chemistry
IIT Madras, Chennai, INDIA
E-mail: gsekar@iitm.ac.in
Homepage:http://sekargroup.com/

Prof. G. Sekar obtained his Ph.D. from IIT Kanpur (India) in 1999 under the guidance of Prof. Vinod K. Singh. Sekar was a JSPS postdoctoral fellow at TUT Japan and an AvH postdoctoral fellow at Göttingen University, Germany. He also carried out postdoctoral research at Caltech, USA. In 2004, he joined IIT Madras as an assistant professor.

He is the recipient of the Senior Scientist Award from the Academy of Sciences Chennai, the CRSI bronze medal, the Institute Research and Development Award (Mid-Career), and the CRS' Research and Innovation Excellence Medal Award-2024. He is a Fellow of the National Academy of Sciences and Indian Academy of Sciences. He is the Jt. Secretary of CRSI.

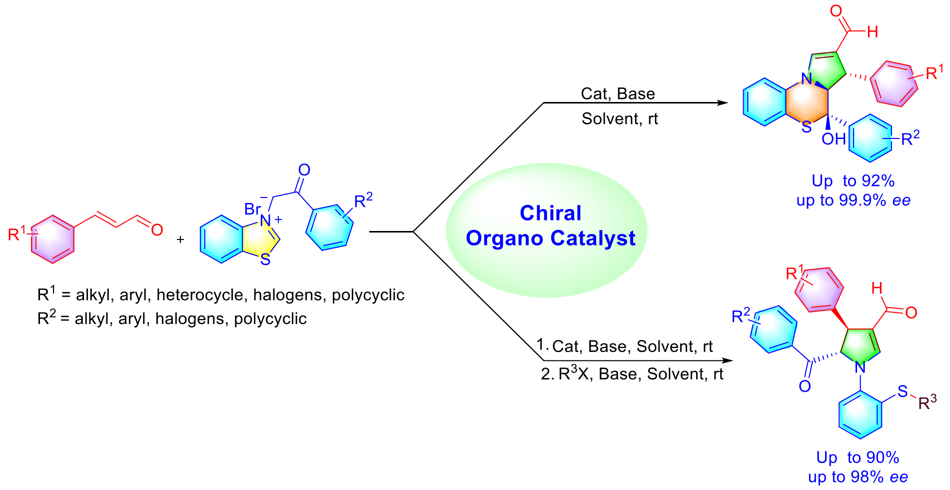
Prof. Sekar’s research activity on organic synthesis focuses on developing new synthetic methodologies employing environmentally benign homogeneous chiral catalysts, metal nanocatalysts, and halogen bonding catalysis. He has published 143 research publications and obtained/filed 13 patents. Prof. Sekar guided 28 Ph.D. students and is presently guiding 12 Ph.D. students.

Asymmetric Domino Synthesis of Chiral Heterocyclic Compounds using Organocatalysts

Dr. G. Sekar

Department of Chemistry, Indian Institute of Technology Madras
Email: gsekar@iitm.ac.in

1,4-Thiazine, benzo[1,4]thiazine, pyrrolo[1.4]thiazine and their polyhydro derivatives are privileged heterocyclic core present in many bioactive molecules.[1-2] Over the past decades, several methods have been developed to construct achiral/racemic pyrrolo[1,4]thiazine derivatives.[3] Recently, Feng *et al.* reported the first synthesis of chiral hydropyrrolo-thiazoles and [1,4]thiazine derivatives using chiral *N,N´*-dioxide/metal catalysts.[4] Herein, we report a proline-derived organocatalytic enantioselective synthesis of pyrrolo[1,2-*d*][1,4]thiazine-2-carbaldehydes using domino 1,3-dipolar cycloaddition/rearrangement of benzothiazolium salt with α,β-unsaturated aldehyde. This domino process produced fluorescent emissive chiral molecules with three contiguous stereocenters, having one chiral quaternary center in a single step. This strategy was extended to the stereoselective one-pot synthesis of chiral *N*-phenyl thioether-tethered tetrasubstituted dihydropyrrole-3-carbaldehydes via 1,3-dipolar cycloaddition/rearrangement, followed by ring-opening/C-S bond formation (Scheme 1).[5]



Scheme 1

References

1. a) S. L. Badshah and A. Naeem, *Molecules.* **2016**, *21*, 1054. b) N. Selvakumar, B. Y. Reddy, G. S. Kumar, M. K. Khera, D. Srinivas, M. S. Kumar, J. Das, J. Iqbal and S. Trehan, *Bioorg. Med. Chem. Lett*. **2006**, *16*, 4416.
2. a) A. N. Matralis and A. P. Kourounakis, *J. Med. Chem.* **2014**, *57*, 2568. b) F. Corelli, F. Manetti, A. Tafi, G. Campiani, V. Nacci and M. Botta, M. *J. Med. Chem*. **1997**, *40*, 125.
3. T. Thielmann, M. Guentert, M. Koepsel and P. Werkhoff, *Tetrahedron Lett.* **1989**, *30*, 4507.
4. X. Zhang, X. Liu, J. Zhang, D. Zhang, L. Lin and X. Feng, *Org. Chem. Front.* **2018**, *5*, 2126.
5. a) S. Pandidurai, V. S. K. Choutipalli, V. Subramanian and G. Sekar, *Org. Lett.*, **2024**, *26*, *15*, 2971. b) S. Pandidurai and G. Sekar, *Org. Biomol. Chem.*, **2024**, *22*, 8119.

Sunkyu Han
Professor
KAIST
Daejeon, Republic of Korea
E-Mail: sunkyu.han@kaist.ac.kr
Homepage: synthesis.kaist.ac.kr

Prof. Sunkyu Han obtained his BS degree at KAIST (Republic of Korea) in 2006 and his Ph.D. at MIT (USA) in 2012 under the supervision of Professor Mo Movassaghi, working on the total synthesis of agelastatin and trigonoliimine alkaloids. He then joined the research group of Professor Scott J. Miller at Yale University (USA), where he worked on peptide-catalyzed site-selective natural products functionalization as a postdoctoral associate. Sunkyu started his independent research career as an Assistant Professor at KAIST (Republic of Korea) in 2014. Professor Han's laboratory is interested in total synthesis of complex natural products and natural-product-inspired development of synthetic methods.

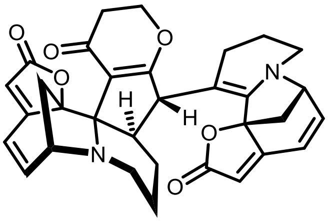
Prof. Han's research group has been focusing on the chemical synthesis of complex natural products, with a particular emphasis on leveraging biosynthetic hypotheses to identify key disconnections, develop novel synthetic strategies, and uncover new reactivities that facilitate crucial bond formations. Among the various families of natural products studied by the group, notable contributions have been made in the synthesis of securinega alkaloids. In particular, Sunkyu and his coworkers have shown a keen interest in the synthesis of high-order and high-oxidation state securinega alkaloids. Among honors and awards, Sunkyu has received an Asian Core Program (ACP) Lectureship Award (2016, 2019, 2024), a POSCO TJ Park Science Fellowship (2017–2018), the Thieme Chemistry Journals Award (2018), and an EWon Assistant Professorship at KAIST (2018–2021), LINKGENESIS Best Teacher Award (2019), Young Organic Chemist Award by the Korean Chemical Society (2020), Hanseong Science Award (2019), KCS-Wiley Young Chemist Award (2022), and Young Scientist Award by the President of Republic of Korea (2022). Sunkyu has been elected to Young Korean Academy of Science and Technology in 2021.

Biosynthetically Inspired Synthesis of Complex Natural Products

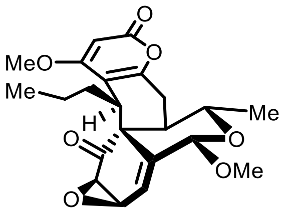
Prof. Sunkyu Han

Korea Advanced Institute of Science and Technology
Email: sunkyu.han@kaist.ac.kr

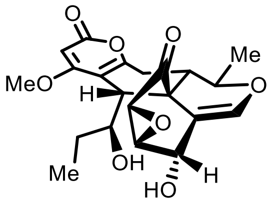
Elucidating the biosynthetic pathways of natural products remains a significant challenge due to the complexities involved in enzyme expression, purification, and the isolation of biosynthetic intermediates in meaningful quantities. In this context, the ability of synthetic chemists to efficiently produce proposed biosynthetic intermediates plays a crucial role in exploring their inherent chemical reactivity. In this presentation, I will discuss our group's recent efforts in the synthesis of natural products with biosynthetic implications. While our synthetic designs are inspired by biosynthetic hypotheses, the synthesis of potential biosynthetic precursors and the investigation of their chemical reactivity have, in turn, provided valuable insights into the biogenesis of these complex natural products.



(–)-suffranidine B



(+)-herpotrichone A



(+)-herpotrichone C

References

1. Kang, G.; Park, S. Han, S.* "Synthesis of High-Order and High-Oxidation State Securinega Alkaloids" *Acc. Chem. Res.* **2023**, *56*, 140.
2. Kang, G.; Han, S.* "Synthesis of Suffranidine B" *J. Am. Chem. Soc.* **2023**, *145*, 24493.
3. Lee, Y.; Han, S.* *manuscript in preparation*.

Panacea Biotech Session;
Chairpersons: Ramakrishna Peddiniti and S. V. Ramasastry

Hirohisa Ohmiya
Professor
Institute for Chemical Research, Kyoto University
Gokasho, Uji, Kyoto 611-0011, Japan
E-Mail: ohmiya@scl.kyoto-u.ac.jp

Homepage: https://www.fos.kuicr.kyoto-u.ac.jp/eng/

Professor Ohmiya received his Ph.D. degree in 2007 under the supervision of Professor Koichiro Oshima, Kyoto University. During this time, he developed new synthetic reactions catalyzed by cobalt complexes. He then moved to the Massachusetts Institute of Technology where he worked with Professor Timothy F. Jamison. In 2008, he started his academic career as an Assistant Professor at Hokkaido University, working with Professor Masaya Sawamura. In 2010, he was promoted to Associate Professor. He developed novel highly selective carbon–carbon bond formation reactions using copper catalyst systems. He started his fully independent career as a full professor at Kanazawa University in 2017, before moving to Kyoto University in 2022.

In his independent career at Kanazawa University and Kyoto University (2017–present), he has made remarkable achievements in the development of "radical catalysis", which controls radical reactions by molecular catalysis. He has received many honors and awards, including the Mukaiyama Award (2021), the JSPS Prize (2024), and the Japan Academy Medal (2024). He is an associate editor of ACS Catalysis (American Chemical Society) since 2024.

Recent Publications

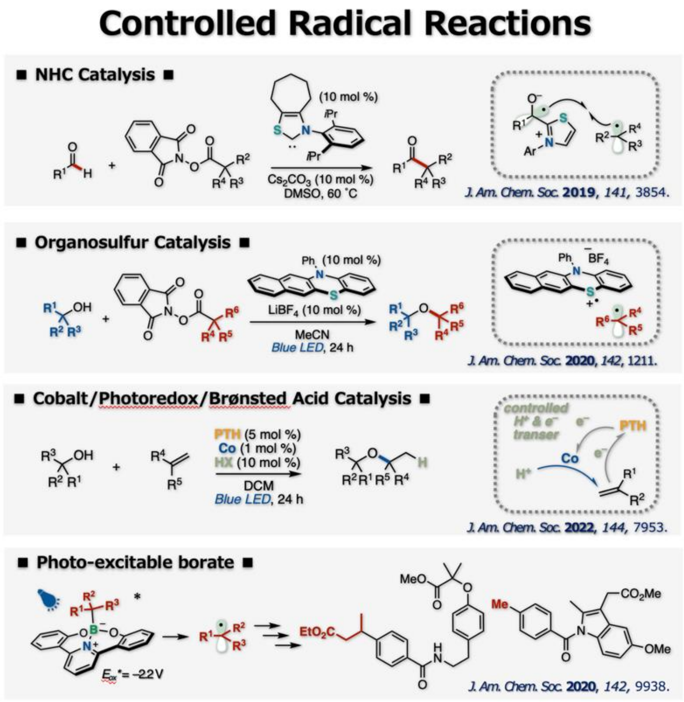
1) Para-Selective C–H Alkylation of Aroyl Chlorides through Organic Photoredox-Catalyzed Radical tele-Substitution, Oya, R.; Sato, H.; Nagao, K.; Ohmiya, H. *Chem* **2025**, *11*, in press.
2) A Dual Cobalt and Photoredox Catalysis for Hydrohalogenation of Alkenes, Shibutani, S.; Nagao, K.; Ohmiya, H. *J. Am. Chem. Soc.* **2024**, *146*, 4375.
3) Synthesis of Tertiary Alkylphosphonate Oligonucleotides through Light-Driven Radical-Polar Crossover Reactions, Ota, K.; Nagao, K.; Hata, D.; Sugiyama, H.; Segawa, Y.; Tokunoh, R.; Seki, T.; Miyamoto, N.; Sasaki, Y.; Ohmiya, H. *Nat. Commun.* **2023**, *14*, 6856.
4) N-Heterocyclic Carbene- and Organic Photoredox-Catalysed meta-Selective Acylation of Electron-Rich Arenes, Goto, Y.; Sano, M.; Sumida, Y.; Ohmiya, H. *Nat. Synth.* **2023**, *2*, 1037.
5) Radical Caging Strategy for Cholinergic Optopharmacology, Nakamura, R.; Yamazaki, T.; Kondo, Y.; Tsukada, M.; Miyamoto, Y.; Arakawa, N.; Sumida, Y.; Kiya, T.; Arai, S.; Ohmiya, H. *J. Am. Chem. Soc.* **2023**, *145*, 10651.
6) Ishii, T.; Kakeno, Y.; Nagao, K.; Ohmiya, H. *J. Am. Chem. Soc*. **2019**, *141*, 3854.
7) Shibutani, S.; Kodo, T.; Takeda, M.; Nagao, K.; Tokunaga, N.; Sasaki, Y.; Ohmiya, H. *J. Am. Chem. Soc*. **2020**, *142*, 1211.
8) Sato Y.; Nakamura K.; Sumida Y.; Hashizume D.; Hosoya T.; Ohmiya, H. *J. Am. Chem. Soc.* **2020**, *142*, 9938.
9) Nakagawa, M.; Matsuki, Y.; Nagao, K.; Ohmiya, H. *J. Am. Chem. Soc.* **2022**, *144*, 7953.

Radical Catalysis

Kyoto University

Email: ohmiya@scl.kyoto-u.ac.jp

In this presentation, we describe new radical catalysis. This is based on the catalyst design focusing on the reaction pathway involving a single electron transfer and the subsequent radical-mediated bond formation. N-Heterocyclic carbene catalysis promoted the decarboxylative coupling of aldehydes and tertiary or secondary alkyl carboxylic acid-derived redox-active esters to produce ketones.[1] A reaction pathway is proposed involving single electron transfer from an enolate form of a Breslow intermediate to a redox ester followed by recombination of the resulting radical pair to form a carbon-carbon bond. Decarboxylative coupling between simple aliphatic alcohol, amine, or thiol nucleophiles and tertiary or secondary alkyl carboxylic acid-derived redox-active esters via visible light-mediated organosulfur catalysis produced a C(sp^3)–X–C(sp^3) fragment.[2] The reaction involves a radical-polar crossover process that allows the formation of a carbocation from a carbon radical. Direct visible light excitation of the organoboronate complex generated alkyl radicals without the need for an external photoredox catalyst.[3] Photoexcitation of the borates is applicable to cross-coupling, allowing the introduction of various C(sp^3) fragments into organic molecules. A visible light-driven triple photoredox/cobalt/Brønsted acid catalysis enabled the Markovnikov hydroalkoxylation of alkenes.[4] The precise control of protons and electrons by three catalysts offers a new approach to valuable dialkyl ethers from readily available alcohols and alkenes without strong acids and external reductants/oxidants.



Controlled Radical Reactions

■ NHC Catalysis ■

J. Am. Chem. Soc. **2019**, *141*, 3854.

■ Organosulfur Catalysis ■

J. Am. Chem. Soc. **2020**, *142*, 1211.

■ Cobalt/Photoredox/Brønsted Acid Catalysis ■

J. Am. Chem. Soc. **2022**, *144*, 7953.

■ Photo-excitable borate ■

J. Am. Chem. Soc. **2020**, *142*, 9938.

Shoubhik Das
Chair Professor
University of Bayreuth
Bayreuth, Germany
E-Mail:shoubhik.das@uni-bayreuth.de

Homepage:https://www.shoubhikdas.unibayreuth.de/en/index.html

Prof. Shoubhik Das obtained his PhD under the guidance of Professor Matthias Beller in 2012 at Leibniz Institut of Catalysis (LIKAT), Germany and followed by this, he did postdoctoral research with Professor Matthew Gaunt at the University of Cambridge, UK and with Prof. Paul Dyson at the EPFL in Switzerland. He started his independent research career (habilitation) in the University of Göttingen, Germany in 2015 and after four years, he moved to the University of Antwerp as a tenure track professor. Since August 2023, he is a chair professor at the Department of Organic chemistry at the University of Bayreuth, Germany. His current research interests are the development of homogeneous and heterogeneous photo-/electrocatalysts and their applications into organic synthesis as well as fuel type molecules.

Since 2008, I have authored >85 articles that have been cited a total of >7300 times (h-index = 51, reference from google scholar). Additionally, my m-index (H-index/ time spent since arrival of first article) is 3.4 which clearly indicates the strong impact of my research.

Selective Awards:

Odysseus Award
Francqui lecturer award
EuChemS young investigator
JSP Fellowship
Liebig Fellowship
UK- India Education and Research Initiative (UKIERI) Fellowship

Selectivity-Driven Sustainability by Using Single Atom Photocatalysts

Prof. Shoubhik Das

Department of Chemistry, University of Bayreuth, Bayreuth, Germany
Email: shoubhik.das@uni-bayreuth.de

Recently solar energy has exhibited great potential as a promising alternative to substituting the traditional energy sources because it is renewable, abundant, affordable, and everlasting. Among various solar energy conversion techniques, photocatalysis is deemed as a promising, environmentally benign, and cost-effective strategy to generate both fuels and high-value chemicals. While in this domain homogeneous photocatalysts prevail due to higher selectivity but the reutilisation of the catalyst is next to impossible. On the other hand, heterogeneous photocatalysts are recyclable but not highly selective. Therefore, to make a bridge between these two, a new strategy has been developed by synthesizing single metal atom photocatalysts that are selective as well as recyclable. In general, single-atom photocatalysts (SACs) have shown their compelling potential and arguably become the most active research direction in photocatalysis due to their fascinating strengths in enhancing light-harvesting, charge transfer dynamics, and surface reactions of a photocatalytic system. SACs could attract such huge attention mainly attributed to the following compelling advantages as compared with their nanocluster, nanoparticle, and bulk counterparts: (i) exclusively high activity and selectivity brought by their unsaturated coordination sites and unique electronic structures, (ii) significant reduction in catalytic metal usage endowed by the maximum atom-utilization efficiency, (iii) easy identification of the reaction mechanisms attributed to well-defined single-atoms as active sites, and (iv) a good platform for understanding structure–activity relationships ascribed to their atomic scale structure. Based on this, recently we have developed several photocatalytic strategies for the synthesis of fuels as well as high valued chemicals *via* C-H bond functionalization, CO_2 utilisation, water oxidation, plastic valorisation etc. where the catalysts exhibited excellent selectivity as well as recyclability.

References

1. P. Ren, G. Barcaro, S. Monti, X. Li, J. Rabeah, P. Kustrwoski, J. Silvestre, S. Bals, S. Das, *J. Am. Chem. Soc.* **2023,** *145*, 16584.
2. P. K. Sahoo, R. Maiti, P. Ren, G. Barcaro, S. Monti, X. Li, J. Rabeah, P. Kustrwoski, J. Silvestre, S. Das. *J. Am. Chem. Soc.* **2025**, in press.
3. R. Maiti, J. Chakraborty, P. V. D. Voort, S. Das, *Angew. Chem. Int. Ed.* **2024**, DOI: 10.1002/anie.202415624.
4. Y. Qin, R. Cauwenbergh, S. Pradhan, R. Maiti, P. Frank, S. Das, *Nature Commun.* **2023**, *14*, 7604.
5. L. Piccirilli, B. Rabell, R. Padilla, A. Rijsager, S. Das, M. Nielsen, *J. Am. Chem. Soc.* **2023**, *145*, 5655.
6. Y. Qin, T. Zhang, V. Ching, S. Raman, S. Das, *Chem* **2022**, *8*, 2472.
7. T. Zhang, J. Rabeah, S. Das, *Nature Commun.* **2024,** *15*, 5208.
8. T. Zhang, J. Vanderghinste, A. Guidetti, S. Van Doorslaer, S. Das, *Angew. Chem. Int. Ed.* **2022,** *61*, e202212083.

Dr. Alakananda Hajra
Department of Chemistry
Visva-Bharati Central University, WB, India
Web: https://www.ahajra.com/
Email: alakananda.hajra@visva-bharati.ac.in
ahajra75@yahoo.com

Dr. Alakananda Hajra graduated (M.Sc) from the Department of Chemistry, Indian Institute of Technology, Kharagpur India in 1998. After completing his Ph.D in 2002 under the supervision of Prof. B. C. Ranu from Indian Association for the cultivation of Science (IACS), Kolkata he joined in SUNY at Albany, USA as a postdoctoral Fellow in the University of Tokyo and M. Hauser (2002-04). He was also a JSPS research fellow in the University of Tokyo and worked with Prof. Eiichi Nakamura and Prof. Masaharu Nakamura from November 2004 to May 2006. He also worked with Prof. N. Yoshikai, NTU, Singapore for one year (2011-2012) as a visiting scientist. He has published more than 225 peer-reviewed articles with more than 11,600 citations, giving him a h-index of 60.
Research Interest: Development of new synthetic methodologies and green synthetic procedures; Visible light mediated functionalization of heterocycles.

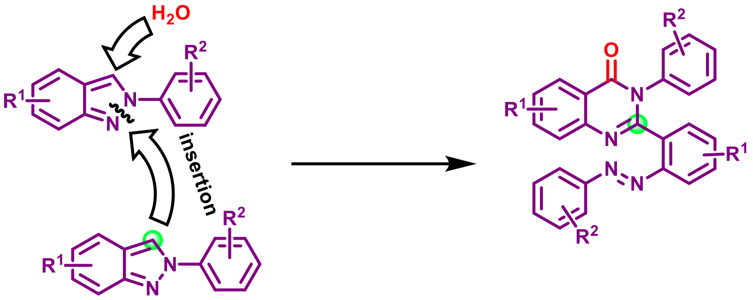
Awards / Honors / Membership:
2019: Professor D Nasipuri Memorial Award by Indian Chemical Society
2018: JSPS Bridge fellowship
2018: Chemical Research Society of India (CRSI) Bronze Medal Award
2015: Prof. D. K. Banerjee Memorial Lecture Award from Indian Institute of Science

Molecular Editing of Azaheterocycles

Alakananda Hajra

Visva-Bharati Central University, West Bengal, India
E-mail: alakananda.hajra@visva-bharati.ac.in
ahajra75@yahoo.com

Molecular editing is an appealing approach to modifying the target molecules either *via* editing peripheral sites (C-H functionalizations) or *via* skeletal editing. Compared to peripheral editing, skeletal editing is a more challenging phenomenon that conveniently enables complex molecular frameworks by the direct modification of core skeletons. Among the *N*-containing heterocylces, azole frame fused heterocyclic compounds are recognized as a privileged structural unit in bioactive natural compounds and in many pharmacophores. Imidazopyridine is one of the important fused bicyclic 5–6 heterocycles and it is recognized as "drug prejudice" scaffold due to its wide applications in medicinal chemistry. In this lecture I will discuss our recent works on molecular editing of imidazo[1,2-*a*] pyridines,[1,2] and indazoles.[3,4]



Scheme 1. Skeletal Editing through Molecular Recombination

Key words: Molecular editing; C-H functionalization; Imidazopyridine; Indazole; Sustainable synthesis.

References

1. Bagdi, A. K.; Santra, S.; Monir, K; Hajra, A. *Chem. Commun.* **2015**, *51*, 1555.
2. (a) Samanta, S.; Mondal, S.; Ghosh, D.; Hajra, A. *Org. Lett.* **2019,** *21,* 4905; (b) Singsardar, M.; Mondal, S.; Laru, S. Hajra, A. *Org. Lett.* **2019,** *21,* 5606; (c) Neogi, S.; Ghosh, A. K.; Mandal, S.; Ghosh, D.; Hajra, A. *Org. Lett.* **2021,** *23,* 6510; (d) Laru, S.; Ghoshal, S.; Sarkar, P. Hajra, A. *Org. Lett.* **2024,** *26,* 5098; (e) Neogi, S.; Bhunya, S.; Ghosh, A. K.; Sarkar, B.; Roy, L.; Hajra, A. *ACS Catal.* **2024**, *14*, 4510.
3. (a)Bhattacharjee, S.; Laru, S.; Hajra, A. *Chem. Commun.* **2022**, *58*, 981; (b) Laru, S.; Bhattacharjee, S.; Hajra, A. *Chem. Commun.* **2022**, *58,* 13604; (c) Sarkar, B.; Ghosh, P.; Hajra, A. *Org. Lett.* **2023,** *25,* 3440; (d) Das, K. K.; Hajra, A. *Chem. Commun.* **2024**, *60,*10402.
4. Bhattacharjee, S.; Hajra, A. *Chem. Eur. J.* **2024**, *e202303240.*

Ravi P. Singh
Professor
Department of Chemistry,
Indian Institute of Technology-Delhi
Hauz Khas, New Delhi
Contact Number: 011-2659-1502
e-Mail: ravips@chemistry.iitd.ac.in

Homepage:
https://sites.google.com/site/ccsliitdelhi/home

Professor Ravi P Singh born in UP, India, is currently professor in chemistry department at the Indian Institute of Technology (IIT) Delhi, India. He obtained his Bachelor’s degree in chemistry from U.P. College, Varanasi and Master’s degree from Banaras Hindu University, Varanasi. Later, he moved to the Chemistry Department at IIT Kanpur, to pursue his Doctoral studies under the supervision of Prof. Vinod K. Singh. He gained his postdoctoral experience in U.S.A in the area of total synthesis and asymmetric catalysis. Dr. Singh spent two years (2005-2007) at Harvard University working with Nobel Laureate, Professor E. J. Corey and four years (2007-2011) at Brandeis University working with Professor Li Deng. He started his independent academic career at National Chemical Laboratory -Pune as a Senior Scientist in 2011 and later moved to the chemistry department at IIT-Delhi in 2013.

Research Interests:

Prof. Singh’s research interest is broadly in the field of synthetic organic chemistry and specifically in Asymmetric Catalysis, C-H Activation and total synthesis of small molecules. His research group is not only pursuing various ways to make and break C-C and C-X bonds but also trying to develop strategies to synthesize biologically active and other pharmaceutically relevant natural products in a cost-effective way.

He has authored 70 research publications and obtained/filed 8 patents. Prof. Singh guided 14 Ph.D. students and is presently guiding 10 Ph.D. students.

Awards and Honours:

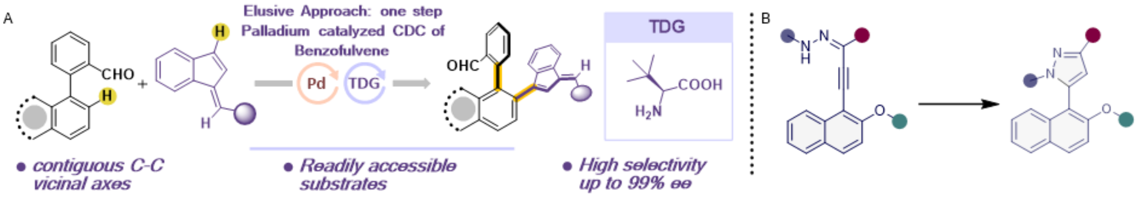
- Member-2009, Sigma Xi, The Scientific Research Society, USA
- ISCB YOUNG SCIENTIST AWARD-2017 IN CHEMICAL SCIENCES
- CRSI Bronze Medal 2023
- Chirantan Rasayan Sanstha Research and Innovation Excellence Award 2024

Atropisomerism in the Realm of Pharmaceutically Relevant Compounds

Ravi P Singh
Department of Chemistry
Indian Institute of Technology Delhi, Hauz Khas, New Delhi, Delhi 110016
Email: ravips@chemistry.iitd.ac.in

Since the collisions in the steric bulk of adjacent big substituents limit the atropisomers' rotation around a single bond, they are not superimposable stereoisomers.1 Biaryl atropisomers are archetypical axially chiral compounds having a single stereogenic axis. Conversely, protocols for the simultaneous installation of multiple stereogenic axes onto different substrate sites have not been widely reported because of the difficulties in managing the sterically impacted multiple stereogenic axes diastereoselectively and enantioselectively.2 An efficient cross-dehydrogenative coupling of electronically rich and sterically congested benzofulvene with bi-(hetero)aryl moieties to construct an axially chiral benzofulvene core with good reactivity and excellent enantioselectivity has been realized.3

Atropisomeric pyrazoles are widely found in natural products, pharmaceuticals, ligands and catalysts owing to their featured biological and catalytic activities.4 However, facile and de novo construction of these motif remains largely underexplored. Herein, we report silver phosphate catalyzed direct 5-endo-dig nucleophilic cyclization of alkynyl naphthalene substituted hydrazides under mild conditions, affording various C−C axially chiral pyrazoles in excellent yields and enantioselectivities.5



Scheme 1. Atropselective synthesis: [A]. Chiral 1,2- diaxial biaryls, [B]. Axially chiral aryl pyrazoles

References

1. a) E. Kumarasamy, R. Raghunathan, M. P. Sibi and J. Sivaguru, *Chem. Rev*., 2015, 115, 11239–11300. (b) J. Wencel Delord, A. Panossian, F. R. Leroux and F. Colobert, *Chem. Soc. Rev*., 2015, 44, 3418–3430. (c) S.-C. Zhang, S. Liu, X. Wang, S.-J. Wang, H. Yang, L. Li, B. Yang, M. W. Wong, Y. Zhao and S. Lu, *ACS Catal*., 2023, 13, 2565–2575.
2. a) D. Lotter, A. Castrogiovanni, M. Neuburger and C. Sparr, *ACS Cent. Sci*., **2018**, 4, 656–660**.** (b) A. Luc and J. Wencel-Delord, *Chem. Commun***., 2023,** 59, 8159–8167**.**
3. Hore, S.; Singh, A.; Singh, R. P. *Chem. Commun*. 2024, 60 (18), 2524–2527.
4. a) Chang, Y.; Xie, C.; Liu, H.; Huang, S.; Wang, P.; Qin, W.; Yan, H. *Nature Communications* **2022**, 13 (1), 1933. (b) Liu, Z.; Gao, B.; Chernichenko, K.; Yang, H.; Lemaire, S.; Tang, W. *Org. Lett*. **2023**, 25, 7004–7008.
5. Singh, B.; Tewari, S.; Singh, R. P. *Submitted result*.

Shikha Gandhi
Assistant Professor
IISER Berhampur
Odisha, INDIA
E-Mail: sgandhi@iiserbpr.ac.in
Homepage: https://shikhagandhi.wixsite.com/research

Shikha got her M.Sc. degree from Panjab University, Chandigarh, in 2004. She subsequently joined the group of Prof. Vinod K. Singh at IIT Kanpur and graduated with a doctoral degree in 2009. She then moved to the Max Planck Institute für Kohlenforschung, Germany, as a post-doctoral researcher in the group of Prof. Benjamin List. After an industrial stint, she started her independent career at IISER Berhampur in 2017.

The research in Shikha's group is focused on catalysis, exploring the areas of transition metal, organocatalysis, and synergistic catalysis to contribute to the development of processes that are scalable, highly efficient from the point of view of atom economy, and environmentally benign. The group has been actively exploring the applications of combined Palladium and Brønsted acid catalysis for propargylic C-H activation. The team is also inclined towards synergistic catalysis involving N-heterocyclic carbenes and palladium. Shikha has been the recipient of the Alexander von Humboldt fellowship for post-doctoral research (2010-2012) and the Thieme Chemistry Journal Award (2019).

Palladium/Brønsted acid catalyzed propargylic C-H activation

Dr. Shikha Gandhi

Indian Institute of Science Education and Research Berhampur
Email: sgandhi@iiserbpr.ac.in

Palladium has been extensively used in organic synthesis for several decades. However, the combination of palladium and Brønsted acid catalysis has not been much explored. One excellent application of this catalysis is the direct allylation of nucleophiles with alkynes and skipped enynes, proceeding via the propargylic C-H activation. While an allyl group is installed with alkynes, enynes lead to the installation of dienes. This fully atom-economical approach makes it a great alternative to the traditional 'Tsuji-Trost allylations'. This talk will present our efforts on the catalytic intramolecular and intermolecular allylations of nucleophiles with alkynes using palladium and Brønsted acid catalysis. Utilizing the ability of skipped enynes to install dienes and the potential of the Pd/HX catalytic system to enable the addition of a nucleophile to a diene, the results of an unprecedented [3+3] annulation of skipped enynes with a bis-nucleophile will also be discussed.

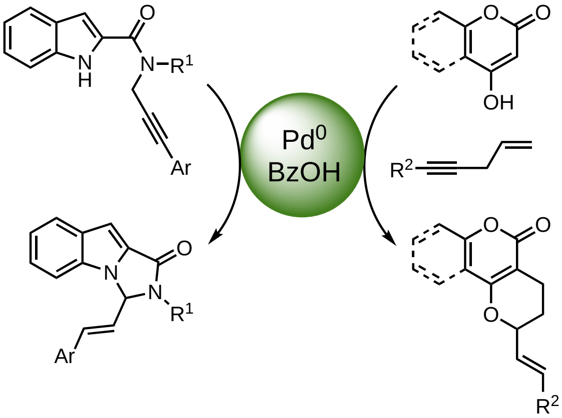


Figure. Pd/HX catalyzed propargylic C-H activation

References

1. B. Khaitan and S. Gandhi, *Org. Lett*. **2024**, *26,* 6961.
2. S. R. Bhoi, C. Debnath and S. Gandhi, *Chem. Commun.* **2024**, *60*, 428.
3. S. Mukhopadhyay, B. Khaitan and S. Gandhi, *Org. Biomol. Chem.* **2023**, *21*, 9326.
4. S. Mukhopadhyay and S. Gandhi, *unpublished results.*

Jubilant Life Sciences Session; Chairpersons: T. Rajamannar and Srinivas Oruganti

George A. O'Doherty
Professor
Northeastern University
Boston, MA, USA
E-Mail: g.odoherty@neu.edu
Homepage: https://www.northeastern.edu/odoherty/

George A. O'Doherty: Born last century in Kilkenny Ireland, the son of two organic chemists. He has subsequently grown into the family business. He received his BS from RPI working with Professor Alan R. Cutler. After earning his Ph.D. with Professor Leo A. Paquette at OSU, he pursued postdoctoral studies with Professor Barry M. Trost and then Anthony G. M. Barrett. His independent career began at University of Minnesota. In 2002, he moved to West Virginia University. He moved again in 2010, to Northeastern University where he remains. His laboratory is interested in the asymmetric synthesis of biological important carbohydrate and natural products. The lab's synthetic efforts in the area of carbohydrate chemistry has had some success at expanding the de novo asymmetric synthesis of carbohydrates to include oligosaccharide targets. A particular focus of the lab is the use of multistep asymmetric synthesis as it is applied to the stereochemical-structure activity relationship (S-SAR) studies of natural product biological activity.

De Novo Asymmetric Synthesis for Natural Product S-SAR

George A. O’Doherty

Northeastern University
Email: g.odoherty@neu.edu

As part of chemistry’s never-ending desire to mimic the elegance of nature, organic chemists have pursued novel methods for the synthesis of natural products. Our contribution to this mission involves the use of asymmetric catalysis for the enantioselective synthesis natural products from achiral starting materials. We refer to this approach as De Novo Asymmetric Synthesis. In this regard, we have been working to develop practical catalytic asymmetric approaches for the synthesis and study of stereochemically complex carbohydrate containing natural products. The stereochemical flexibility this approach engenders, allows us to carry out novel Stereochemical-Structure Activity Relationship (S-SAR) studies on these natural products with an emphasis on the carbohydrate portion of the molecule. For example, we have successfully used the tools of catalytic asymmetric synthesis to systematically map the stereochemical aspects of the structure activity relationship for the oligosaccharide portion of the cardiac glycosides. This effort and its application for oligosaccharide synthesis and related medicinal SAR-chemistry studies will be discussed.[1-9]

References

1. *Exploration of the Fusidic Acid Structure Activity Space for Antibiotic activity*. Kang, Y.-S.; Silva, S. C.; Smith, K.; Sumida, K.; Wang, Y.; Chiaraviglio, L.; Donthiri, R.R.; Aljahdali, A. Z. James E. Kirby, J. K.; George A. O’Doherty, G. A.. *Molecules,* **ASAP**.
2. *Simplified Method for Kinetic and Thermodynamic Screening of Cardiotonic Steroids Through the K+-Dependent Phosphatase Activity of Na^+/K^+-ATPase with Chromogenic pNPP Substrate.* Azalim-Neto, P.; Noel, F.; Sliva, C. S.; Villar, J. A. F. P.; Barbosa, L.; O'Doherty, G. A. Quintas, L. E. M. *Molecular Pharmacology,* **2024**, *106*, 225–239.
3. *Exploring a de novo route to bradyrhizose and its diastereomers: synthesis and isomeric equilibrium of reducing bicyclic carbohydrates*. Cunha, V. L. S.; O'Doherty, G. A.; Lowary, T. L. *Chem. Eur. J.,* **2024**, *30*, e202400886.
4. *Asymmetric Achmatowicz Approach to Oligosaccharides*. Kim, S.; Oiler, J.; Xing, Y.; O’Doherty, G. A. *Chem. Commun.,* **2022**, *58*, 12913 - 12926.
5. Identifying Requirements for RSK2 Specific Inhibitors. Wright, E. B.; Fukuda, S.; Li, M.; Li, Y.; O’Doherty, G. A.; Lannigan, D. A. *J. Enzyme Inhib. Med. Chem*. **2021**, *36* (1), 1798-1809.
6. Structure-activity relationship of avocadyne. Tcheng, M.; Cunha, V. L. S.; Ahmed, N.; Liu, X.; Smith, R. W.; Rea, K. A.; Akhtar, T. A.; D’Alessandro, A.; Minden, M. D.; Vockley, J.; O’Doherty, G. A.; Lowary, T. L.; Spagnuolo, P. A. *Food Funct*. **2021**, 6323-6333.
7. “Synthesis of *O*-linked cyclitol analogues of Gilvocarcin M and antibacterial activity” Sharif, E. U.; Shi, P.; O’Doherty, G. A. *Isr. J. Chem.* **2021**, *61*, 394-400.
8. Total and Formal Syntheses of Fostriecin. Gao, D.; Li, B.; O’Doherty, G. A. *Org. Chem. Front.,* **2020**, *7*, 3608-3615.
9. Synthesis and Biological Study of the Phomopsolide and Phomopsolidone Natural Products. Aljahdali, A. Z.; Foster, K. A.; O’Doherty, G. A. *Chem. Commun.* **2020**, *56*, 12885-12896.

M. Manoharan
Senior Vice President,
Alnylam Pharmaceuticals
Boston, USA
Email: smmanoharan@alnylam.com

Dr. Muthiah (Mano) Manoharan serves as the Senior Vice President of Drug Innovation, a Scientific Advisory Board Member, and a Distinguished Research Scientist at Alnylam Pharmaceuticals, Cambridge, Massachusetts. In 2003, he was the founding chemist hired at Alnylam as the Head of the Drug Discovery. He and his team pioneered the discovery and development of numerous chemical modifications, GalNAc conjugation chemistry, lipid conjugates (the first in vivo demonstration of RNAi in 2004) and Lipid Nanoparticles (LNP) delivery platform that made RNA interference-based human therapeutics possible. This work led to the approval of five RNAi therapeutics: ONPATTRO® (patisiran, 2018), GIVLAARI® (givosiran, 2019), OXLUMO® (lumasiran, 2020), LEQVIO® (inclisiran, 2020, 2021) and AMVUTTRO® (vutrisiran, 2022).

Dr. Manoharan has had a distinguished career as a world-leading chemist in the field of oligonucleotide therapeutics. Prior to joining Alnylam, he worked at Isis (Ionis) Pharmaceuticals from 1990-2003 in the field of antisense oligonucleotides. He is an author of more than 250 publications (nearly 70,000 Google Scholar citations with an h-index of 123 and an i10-index of 452) and over 500 abstracts, as well as an inventor of over 300 issued U.S. patents.

Dr. Manoharan is the winner of the Lifetime Achievement Award of the Oligonucleotide Therapeutics Society (OTS, 2019), the M. L. Wolfrom Award (2007), D. Horton Industrial Carbohydrate Chemistry Award (2021) from the Carbohydrate Chemistry Division of the American Chemical Society, the Chemical Research Society of India (CRSI) 2022 Medal by the Council of the Chemical Research Society of India and the National Chemical Laboratory (NCL, Pune, India)-K. N. Ganesh award in 2023 . He was elected as a Fellow of the American Chemical Society in 2022. He has been honored with the Professor Ronald Breslow Biomimetic Chemistry National award by the American Chemistry for the year 2024. He also holds a visiting Professorship at IIT-Bombay in the department of Chemistry.

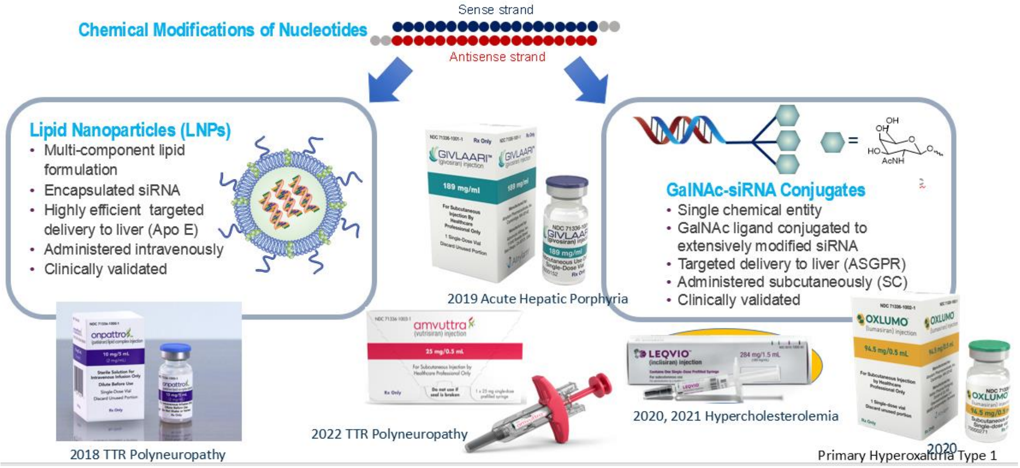
Dr. Manoharan was born in Madurai, Tamil Nadu, India and received his B.Sc. and M.Sc. degrees in chemistry at the American College, Madurai, India. He earned his Ph.D. in chemistry at the University of North Carolina, Chapel Hill, (Professor Ernest L. Eliel) and learned the field of oligonucleotides at Yale University and University of Maryland as a post-doctoral research associate (Professor John A. Gerlt).

Biomimetic Chemistry of RNA Therapeutics

Muthiah Manoharan

Alnylam Pharmaceuticals, Cambridge, MA 02142, USA

According to Professor Ronald Breslow, "biomimetic chemistry" is new chemistry inspired by the principles used by Nature. Synthetic small interfering RNAs (siRNAs) are potent inhibitors of gene expression. These molecules are perfect examples of biomimetic chemistry as synthetic siRNAs act through the natural RNA interference (RNAi) pathway. To deliver therapeutic siRNAs into human liver, we developed approaches that include chemical modification of the siRNAs and either lipid nanoparticle (LNP) formulation or multivalent *N*-acetylgalactosamine (GalNAc) conjugation, making possible intravenous and subcutaneous administration, respectively. The design of chemical modifications of siRNAs to enable favorable Argonaute2 (Ago2) recognition as well as both delivery strategies rely on biomimetics. The LNP approach is based on the endogenous Apo-E ligand /LDL receptor process. Conjugation of the GalNAc ligand to an siRNA mediates it uptake into liver hepatocytes through the asialoglycoprotein receptor. Using these strategies five approved RNAi therapeutics have emerged from Alnylam. We have also used lipid conjugates for CNS delivery of therapeutic siRNAs.



This presentation will cover the chemical biology of RNA therapeutics including the chemical modifications and motifs used in each RNA strand to ensure uptake into cells of the targeted tissue, Ago2 recognition, silencing efficiency, metabolic stability, and safety.

References

1. M. Egli, M.Manoharan, Chemistry, structure and function of approved oligonucleotide therapeutics, *Nucleic Acids Research*, **2023**, *51*, 2529–2573. https://doi.org/10.1093/nar/gkad067
2. M. Egli, M. Manoharan, Re-engineering RNA molecules into therapeutic agents. *Acc. Chem. Res*., **2019**, *52*, 1036-1047.
3. A. Akinc et al. The ONPATTRO story and the clinical translation of nanomedicines containing nucleic acid-based drugs. *Nat. Nanotechnol.* **2019**, *14*, 1084-1087
4. D. R.Corey, M.J. Damha, M.Manoharan, Challenges and Opportunities for Nucleic Acid Therapeutics. Nucleic Acid Ther. **2022**, *32*, 8-13.

Basker Sundararaju
Professor
Department of chemistry,
Indian Institute of Technology Kanpur,
Kanpur, Uttar Pradesh, India – 208016.
E-Mail: basker@iitk.ac.in
Homepage: https://home.iitk.ac.in/~basker/Publications.html

Basker Sundararaju obtained his Ph.D. in 2011 from Université de Rennes 1, France. He then pursued a two-year postdoctoral fellowship at the Max-Planck Institute, Mülheim, under Prof. Alois Fürstner (2011–2013), supported by an AvH Fellowship. In October 2013, he started his independent academic career as an Assistant Professor at IIT Kanpur, where he was promoted to Associate Professor in 2018 and Full Professor in 2022.

His research primarily focuses on base-metal catalysis, including [Fe], [Co], and [Mn] systems, with applications in C-H bond functionalization, hydrogen neutral concepts, stereoselective functionalization, waste recycling, CO_2 valorization, and asymmetric catalysis. He has collaborated extensively with international researchers, particularly from the UK, France, Germany, and Russia. He has published 83 papers, cited over 5,000 times, and holds an H-index of 38.

Dr. Sundararaju has received numerous accolades, including the Thieme Chemistry Journal Award (2014), BRNS Young Scientist Award (2014), PK Kelkar Young Faculty Award (2017), Merck Young Scientist Award (2019), CRSI Bronze Medal (2023), and was elected a Fellow of the Royal Society of Chemistry (FRSC) in 2022. He served on the Early Career Editorial Advisory Board of *ACS Catalysis* (2018–2020) and an Associate Editor of *Journal of Heterocyclic Chemistry* since 2019-24.

Evolution of Co(III)-Catalysis in Asymmetric C-H Bond Functionalizations

Basker Sundararaju

Professor, Department of chemistry, Indian Institute of Technology Kanpur, Kanpur, Uttar Pradesh, India – 208016.
Email: basker@iitk.ac.in

Since Murahashi's groundbreaking work on cobalt-catalyzed C-H bond carbonylation in 1955,[1] the field of C-H bond functionalization has made significant strides, particularly with the development of low-valent cobalt systems.[2] While the use of in situ-generated or isolated cobalt(III) catalysts for C-H activation was seldom explored until the independent studies by Matsunaga and Daugulis in 2014,[3] recent advancements have shed light on the intricate coordination environment around cobalt and the mechanisms driving these catalytic cycles.[4e-f] In this talk, I will review the progress made over the past decade in Co(III)-catalyzed C-H bond functionalization,[4-6] focusing on both mono- and bidentate directing groups, and the role of spectator ligands in the latter. I will also discuss how replacing these spectator ligands with external chiral ligands can induce chirality at the metal center through an enantiodetermining C-H activation step, and how these factors impact the efficiency and selectivity of asymmetric transformations.[5] Additionally, I will highlight our systematic efforts to replace Mn(II) with photocatalysts[4c,6a] or oxygen as sole oxidants,[6b] thereby eliminating the need for stoichiometric metal oxidants in asymmetric C-H bond annulations using the Co/Salox catalytic system.

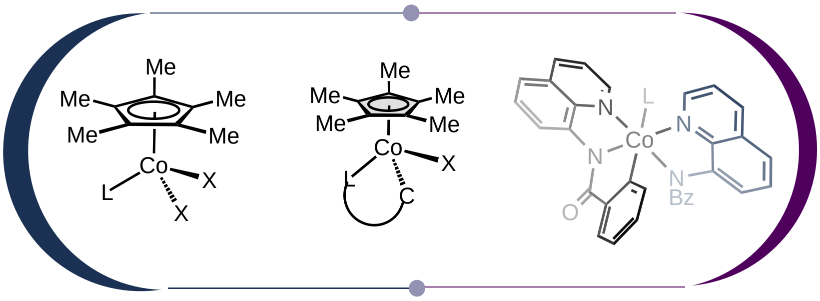


Figure 1: Overview Co(III) catalysts in C-H bond Functionalizations

References

1. S. Murahashi, *J. Am. Chem. Soc.*, **1955**, *77*, 6403-6404.
2. (a) K. Gao, N. Yoshikai, *Acc. Chem. Res.* **2014**, *47*, 1208-1219. (b) S. Pradhan, D. Satav, S. Dutta, B. Maity, L. Cavallo, B. Sundararaju, *Nat. Commun*. **2024**, *15*, 10421.
3. (a) L. Grigorjeva, O. Daugulis, *Angew. Chem. Int. Ed*. **2014**, *53*, 10209-10212. (b) T. Yoshino, H. Ikemoto**,** S. Matsunaga and M. Kanai, *Angew. Chem. Int. Ed.* **2013**, *52*, 2207-2211.
4. (a) Sen, M.; Emayavaramban, B.; Barsu, N.; Premkumar, J. R.; B. Sundararaju, *ACS Catal*. **2016**, *6*, 2792-2796. (b) Barsu, N.; Bolli, S. K.; Sundararaju, B. *Chem. Sci*. **2017**, *8*, 2431. (c) Kalsi, D.; Dutta, S.; Barsu, N.; Rueping, M.; Sundararaju, B. *ACS Catal*. **2018**, *8*, 8115-8120. (d) Barsu, N.; Kalsi, D.; Sundararaju, B. *Catal. Sci. Technol*. **2018**, *8*, 5963. (e) R. Mandal, B. Garai, B. Sundararaju, *ACS Catal*., **2022**, *12*, 3452. (f) R. mandal, B. Garai, B. Sundarraju, *Science of Synthesis*, **2023**, *3*, 149-260.
5. B. Garai, A. Das, D. V. Kumar, B. Sundararaju, *Chem. Commun*. **2024**, *60*, 3354. A, Das, R. Mandal, H. S. Ravikumar, S. Kumaran, J. R. Premkumar, D. Borah, B. Sundararaju, *Angew. Chem. Int. Ed.* **2024**, *63*, e202315005.
6. (a) Dwivedi, V.; Kalsi, D.; Sundararaju, B. *ChemCatChem*, **2019**, *11*, 5160. (b) A. Das, S. Kumaran, H. S. Ravi Shankar, J. R. Premkumar, B. Sundararaju, B. *Angew. Chem. Int. Ed.* **2024**, e202406195. (b) Manuscript Submitted.

Syngenta Session;
Chairpersons: N. Selvakumar and Vishal Rai

Suvarn Kulkarni
Department of Chemistry,
Indian Institute of Technology Bombay,
Powai, Mumbai-400076, India
suvarn@chem.iitb.ac.in

Suvarn Kulkarni received his Ph.D. in Organic Chemistry from University of Pune in 2001. After his Ph. D., he pursued his post-doctoral research at Academia Sinica, Taipei, and University of California, Davis. He returned to India in late 2008 and held a faculty position at IACS Kolkata prior to joining the Indian Institute of Technology Bombay in 2009. He is presently working as Biswas-Palepu Distinguished Chair Professor and Dean of Academic Programs at IIT Bombay. His current research interests include devising newer ways for efficient chemical synthesis of rare sugar containing complex glycoconjugates specifically expressed on the surfaces of pathogenic bacteria for the development of antibiotics, therapeutics and vaccines.

Suvarn was a short term Visiting Professor (MOST) at Taiwan in 2014. He is a Fellow of the Royal Society of Chemistry London, Fellow of National Academy of Sciences, India (NASI) and Fellow of Maharashtra Academy of Science. He is a recipient of the CRSI Bronze medal for the year 2017 and Dr. H. C. Srivastava Young Scientist award 2016 from ACCTI. He is a member of the editorial board of Organic Letters, Carbohydrate Research, Chemistry Select and guest editor of international journals such as EJOC, OBC and Frontiers in Chemistry. Recently he received IRCC research Dissemination Award and Research Publication Award from IITB. Most importantly, he was selected by the students for the Excellence in Teaching Award at IIT Bombay in 2017 and also for the prestigious Prof. S. P. Sukhatme Award for Excellence in Teaching in 2020.

Total Synthesis of Zwitterionic Polysaccharide Repeating Units

Suvarn S. Kulkarni

Department of Chemistry,
Indian Institute of Technology Bombay,
Powai, Mumbai-400076, India
suvarn@chem.iitb.ac.in

Bacterial glycoconjugates are comprised of rare D and L deoxy amino sugars, which are not present on the human cell surface. This peculiar structural difference allows discrimination between the pathogen and the host cell and offers avenues for target-specific drug discovery and carbohydrate-based vaccine development.[1] However, they cannot be isolated with sufficient purity in acceptable amounts, and therefore chemical synthesis is a crucial step toward the development of these products.[2,3] We recently established short and convenient methodologies for the synthesis of orthogonally protected bacterial D and L-deoxy amino hexopyranoside and glycosamine building blocks starting from cheaply available D-mannose and L-rhamnose.[4,5] The one-pot protocols rely on highly regioselective nucleophilic displacements of triflates. These procedures have been applied to the synthesis of various bacterial glycoconjugates[6] as well as metabolic oligosaccharide engineering.[7] The studies led to discovery of selective inhibitors of glycan biosynthesis.[8]

Zwitterionic polysaccharides (ZPSs) are endowed with unique immunological properties as they can directly bind to T-cells in the absence of protein conjugation. ZPSs are therefore considered to be potential antigens for the development of totally carbohydrate-based vaccines. In this talk I will present our recent results on the total synthesis of highly complex and densely functionalized zwitterionic polysaccharide repeating units.[9,10]

References

1. Dube, D.H.; Champasa, K.; Wang, B. *Chem. Commun.* **2011**, *47*, 87-101.
2. Kulkarni, S. S.; Wang, C. C.; Sabbavarapu, N. M.; Podilapu, A. R.; Liao, P. H.; Hung, S.-C. *Chem. Rev.* **2018**, *118*, 8025–8104.
3. Emmadi, M.; Kulkarni, S. S. *Nat. Prod. Rep.* **2014**, *31*, 870-879.
4. Emmadi, M.; Kulkarni, S. S. *Nature Protocols* **2013**, *8*, 1870-1889.
5. Sanapala, S. R.; Kulkarni S. S. *J. Am. Chem. Soc.* **2016**, *138*, 4938−4947.
6. Behera. A.; Rai, D.; Kulkarni, S. S. *J. Am. Chem. Soc.* **2020**, 142, 456-467.
7. Clark, E. I.; Emmadi, M.; Krupp, K. L.; Podilapu, A. R.; Helble, J. D.; Kulkarni, S. S.; Dube, D. H. *ACS Chem. Biol.* **2016**, *11*, 3365-3373.
8. Williams, D. A.; Pradhan, K.; Paul, A.; Olin, I. R.; Tuck, O. T.; Moulton, K. D.; Kulkarni, S. S.; Dube, D. H. *Chem. Sci.* **2020**, *11*, 1761-1774.
9. Puri, K.; Kulkarni, S. S. *Org. Lett.* **2021**, *23*, 7083-7087
10. Puri, K: Kulkarni S. S. *Comms. Chem.* **2024**, xxxx

Uttam K. Tambar
Bonnie Bell Harding Professor in Biochemistry
Director of Organic Chemistry Graduate Program
The University of Texas Southwestern Medical Center at Dallas
Dallas, TX, USA
E-Mail: uttam.tambar@utsouthwestern.edu

Homepage: http://www.utsouthwestern.edu/labs/tambar/
Twitter: @TambarLab

Uttam K. Tambar moved from India to New York City in 1982. He received his A.B. degree from Harvard University in 2000, where he conducted research with Professors Cynthia Friend and Stuart Schreiber. He obtained his Ph.D. from the California Institute of Technology in 2006 under the guidance of Professor Brian Stoltz. After he completed his NIH Postdoctoral Fellowship at Columbia University with Professor James Leighton in 2009, Uttam began his independent research career at UT Southwestern Medical Center in Dallas. The Tambar lab is interested in asymmetric catalysis, natural product synthesis, chemical biology, and medicinal chemistry. Uttam has received several awards, including the Thieme Chemistry Journal Award (2012), Sloan Foundation Research Fellowship (2013), Welch Foundation Norman Hackerman Award in Chemical Research (2019), and Arthur C. Cope Scholar Award (2024). Uttam is currently the Bonnie Bell Harding Professor in Biochemistry, Director of the Organic Chemistry Graduate Program, and Co-Leader of the Simmons Cancer Center’s Chemistry and Cancer Program.

Stereoselective Reactions with Feedstock Chemicals

Dr. Uttam K. Tambar

The University of Texas Southwestern Medical Center at Dallas
Email: uttam.tambar@utsouthwestern.edu

For several decades, chemists have designed new approaches to valuable materials that are economically efficient and environmentally benign. To this end, synthetic chemists have developed new synthetic strategies to access complex molecules from simple, inexpensive, and abundant feedstock chemicals. Our research group explores. new methods in this area. We present recent examples from our laboratory of stereoselective reactions with feedstock chemicals as starting materials. First, we discuss our approach to the stereoselective functionalization of unsaturated hydrocarbons through catalytic pericyclic reactions with chalcogen-based reagents. For example, we have developed enantioselective allylic functionalizations of terminal and internal alkenes. Second, we describe our approach to the enantioselective α-alkylation of aldehydes with amino acid derived alkylating reagents. We have devised a strategy for the activation of pyridinium salts derived from amino acids through the formation of light-activated charge transfer complexes with catalytically generated electron rich chiral enamines derived from aldehyde substrates and a chiral amine catalyst.[1–10]

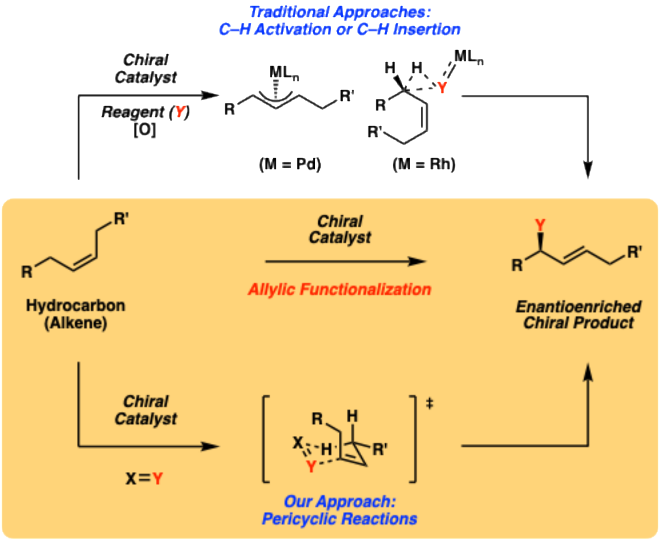


Figure 1: Stereoselective allylic functionalization of alkenes through catalytic pericyclic reactions

References

1. H. Bao and U. K. Tambar, *J. Am. Chem. Soc.* **2012**, *134*, 18495-18498.
2. H. Bao, L. Bayeh, and U. K. Tambar, *Synlett* **2013**, 24, 2459-2463.
3. H. Bao, L. Bayeh, and U. K. Tambar, *Angew. Chem. Int. Ed.* **2014**, *53*, 1664-1668.
4. H. Bao, L. Bayeh, and U. K. Tambar, *Chem. Sci.* **2014**, *5*, 4863-4867.
5. L. Bayeh and U. K. Tambar, *e-EROS Encyclopedia of Reagents for Organic Synthesis*, **2015**, 1-3.7.
6. L. Bayeh and U. K. Tambar, *ACS Catal.* **2017**, *7*, 8533-8543.
7. C. E. Sleet and U. K. Tambar, *Angew. Chem. Int. Ed.* **2017**, *56*, 5536-5540.
8. L. Bayeh, P. Q. Le, and U. K. Tambar, *Nature,* **2017**, *546*, 196-200.
9. L. Qin, M. Sharique, and U. K. Tambar, *J. Am. Chem. Soc.* **2019**, *141*, 17305-17313.
10. S. Reddy Yetra, N. Schmitt, and U. K. Tambar, *Chem. Sci.* **2023**, *14*, 586-592.

Prasanta Ghorai
Professor
IISER Bhopal
Bhopal, INDIA
E-Mail: pghorai@iiserb.ac.in
Homepage: https://pggroup.wixsite.com/pgiiserb

Prasanta Ghorai obtained his B.Sc. (Hons in Chemistry) from Vidyasagar University, West Bengal. Subsequently, he did his M.Sc. (Chemistry) from IIT Bombay in 2002 and Ph.D. at the University of Regensburg, Germany in the area of Organic and Medicinal Chemistry in 2005. Afterward, he was involved in post-doctoral research at the University of Nebraska-Lincoln in USA from 2005-2009. He joined the then new IISER Bhopal as an Assistant Professor (Chemistry) in 2009 and became Professor in 2019. He is honoured as DAAD Research Ambassador of India by DAAD Germany. Dr. Ghorai has been selected for the prestigious Chemical Research Society of India (CRSI) Bronze Medal for the year 2017 for his contribution in Chemistry.

Dr. Ghorai's research work falls in the area of synthetic organic chemistry, more specifically, asymmetric synthesis and catalysis. The main aim of his group is to develop new strategies and chiral catalysts for enantioselective reactions.

Bifunctional Organocatalytic Michael Additions as the Key Strategy: Enantioselective Synthesis of Fused and Spirocyclic Organic Molecules

Prasanta Ghorai*

Indian Institute of Science Education and Research Bhopal, Bhopal-462066, India.
Email: pghorai@iiserb.ac.in

Intramolecular oxa-, aza- and carba-Michael reactions are the most fundamental but very powerful tools to construct oxa-, aza-, and carba-cycles, respectively. The development of the corresponding asymmetric variants, often, remained significantly challenging.[1] We have developed few independent cinchona alkaloid based chiral bifunctional amino-thiourea/ squaramide catalyzed strategies for efficient enantioselective cyclization of alcohol, emnamine, and carbon nucleophiles for the synthesis of chiral oxa-, aza-, and carba-cycles, respectively.[2-5]

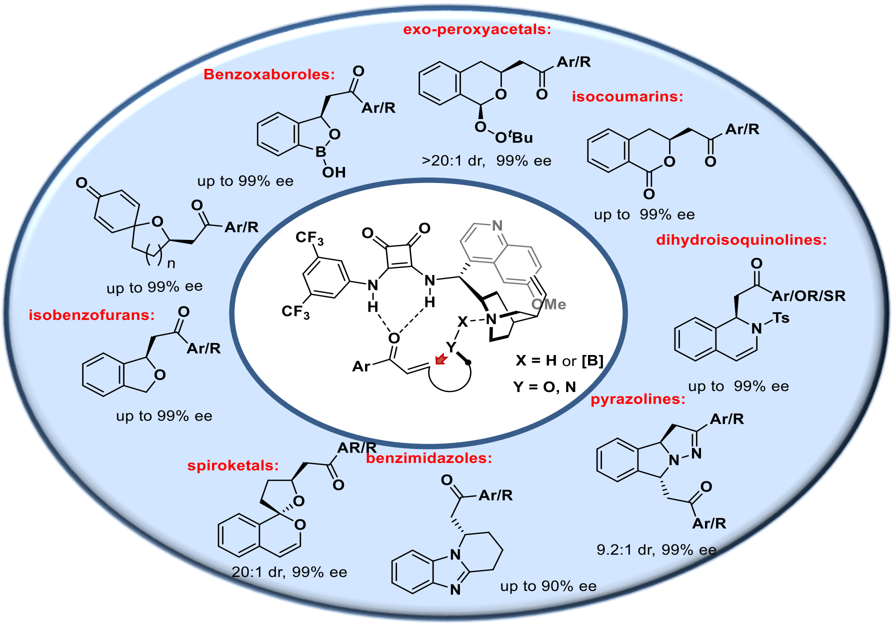


Figure: Intramolecular oxa-and aza-Michael reactions

References

[1] C. F. Nising, S. Bräse, *Chem. Soc. Rev.* **2012**, *41*, 988.

[2] a) S. Maity, B. Parhi, P. Ghorai, *Angew. Chem. Int. Ed.*, **2016**, *55*, 7723. b) B. Parhi, S. Maity, P. Ghorai, *Org. Lett.* **2016**, *18*, 5220. c) R. R. Reddy, S. S. Gudup, P. Ghorai, *Angew. Chem. Int. Ed.* **2016**, *55*, 15115. d) G. Hazra, S. Maity, S. Bhowmick, P. Ghorai, *Chem. Sci.* **2017**, *8*, 3026. f) A. Midya, S. Maity, P. Ghorai, *Chem. Eur. J.* **2017**, *23*, 11216.

[3] T. K. Roy, B. Parhi, P. Ghorai, *Angew. Chem., Int. Ed.* **2018**, *57*, 9397.

[4] a) R. R. Reddy, P. Gayen, S. Panda, P. Ghorai, *Org. Lett.* **2019**, 21, 5793. b) T. K. Roy, S. S. Gorad, P. Ghorai, *Org. Lett.* **2022**, *24*, 1889. c) S. Panda, U. Gayen, P. Ghorai, *Chem. Eur. J.* **2023**, *29*, e202203407.

[5] (a) P. Gayen, P. Ghorai, *Org. Lett.* **2023**, *25*, 3835. (b) D. Das, C. Kamilya, P. Ghorai, *Org. Lett.* **2023**, *25*, 6993. (c) C. Kamilya, S. S. Gorad, P. Ghorai, *Chem. Eur. J.* **2024**, e202303980. (d) P. Gayen, S. Sar, P. Ghorai, *Angew. Chem. Int. Ed.* **2024**, *63*, e202404106. (e) D. Das, R. K. Pingoliya, P. Ghorai, *Org. Lett.* **2024**, *26*, 4502. (f) S. Panda, N. D. Chavan, P. Ghorai

Ramakrishna G. Bhat
Professor
Department of Chemistry
Indian Institute of Science Education and Research (IISER), Pune
Contact Number: 02025908092
E-Mail: rgb@iiserpune.ac.in
Homepage: http://www.iiserpune.ac.in/~rgb

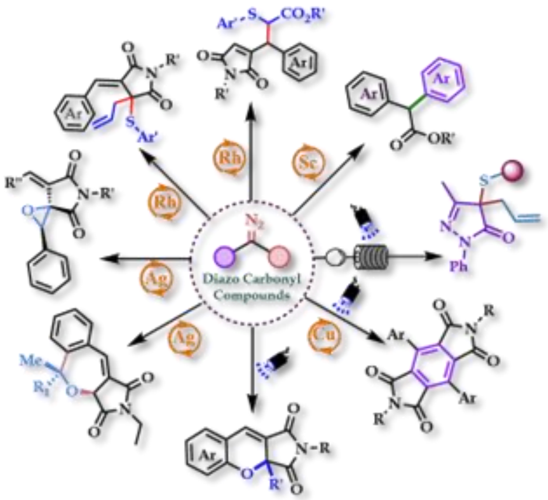
Professor Ramakrishna G. Bhat (RGB) obtained his PhD degree (2004) from the Department of Organic Chemistry, Indian Institute of Science (IISc) Bengaluru under the supervision of Prof. Srinivasan Chandrasekaran. Subsequently, he joined Prof. Brian M. Pinto's research group as a postdoctoral fellow at the Simon Fraser University, British Columbia, Canada. Later in the year 2006, he began his independent career at the Indian Institute of Science Education and Research (IISER) Pune and he was promoted to Full Professor in 2019. His research focusses on 'Organic Synthesis and Catalysis' encompassing the broad research areas on Photoredox catalysis, Photoinduced as well as metal catalyzed Carbene transfer reactions, C-H bond functionalization and Organocatalysis. He has been actively involved in the outreach educational activities and Teachers' training programs extensively. IISER Pune has conferred on him the very first 'Excellence in Teaching and Contributions to Teaching' award in 2022, the commencement year of the Teaching Award. He is also a member of Early Career Editorial Board in the *Tetrahedron Letters and Tetrahedron*.

Versatile Reactivity of Diazo Carbonyl Compounds Towards Metal Catalysts and Visible Light

Ramakrishna G. Bhat

Department of Chemistry, Indian Institute of Science Education and Research (IISER) Pune
Email: rgb@iiserpune.ac.in

Diazo carbonyl compounds have broad and tuneable reactivity.[1a] Owing to their versatile reactivity, diazo compounds have been utilized in diverse transformations in organic synthesis as well as in interdisciplinary fields.[1b] Developing catalytic methods for the chemo- and regio-selective C-H bond functionalization is highly desirable as well as challenging. Over the years, we have been exploring the reactivity of diazo carbonyl compounds both under metal and visible light catalysis. We have developed a robust propargyl α-aryl-α-diazoacetate as a new class of reagent for the effective C-H bond functionalization of unactivated arenes, 1,3 diketones & β-keto acids via scandium catalysis to access useful functionalized compounds.[2] Likewise, we have been exploring the diverse reactivity of diazo arylidene succinimides (DASs) under metal as well visible light catalysis to access useful compounds like 2*H*-chormenes, PMDI etc.[3] This presentation will provide an overview of some of the recent advancements from our research group.



References

1. a) Davies, H. M. L.; Morton, D. *Chem. Soc. Rev.*, **2011**, *40*, 1857-1869 b) Ribas, X.; Ma, D.; Spivey, J. J.; Casitas, A.; Fairlamb, I. J. S.; Vedernikov, A. N.; Mirica, L. *C-H and C-X Bond Functionalization: Transition Metal Mediation*; Royal Society of Chemistry: Cambridge, U.K. b) Lednicer, D. *Strategies for Organic Drug Synthesis and Design*; Wiley: Hoboken, **2008**; pp 43-88.
2. a) Navale, B. S.; Laha, D. and Bhat, R.G. *Tetrahedron Lett.* **2019**, *60*, 1899–1903 b) Navale, B. S.; Laha, D.; Banerjee, S.; Vanka, K.; Bhat, R. G. *J. Org. Chem.* **2022**, *87*, 13583–13597
3. a) *Laha, D.;* Bhat, R. G. *Asian J. Org. Chem.* **2020**, *9*, 918-921 b) Bankar, O. S.; Laha, D.; Meher, K. B.; Bhat, R. G. *Chem Asian J.* **2023**, *e202300774*. c) Laha, D.; Meher, K. B.; Bankar, O. S.*;* Bhat, R. G. *Asian J. Org. Chem.* **2022**, e202200062 d) Bankar, O. S.; Pal, C.; Laha, D.; Abhijeet S. Sabale, Bhat, R. G. *Organic Lett.*, **2024**, *26, 9191–9197* e) Laha, D.; Bankar, O. S.; Navale, B. S.; Santra, S.; Gosh, D.; Bhat, R. G. *Organic Lett.* **2024**, *26*, 8674–8679 f) Meher, K. B. Laha, D. Dharpure, P. D.; Bhat, R.G. *Organic Lett.* **2024**, *26*, 10241–10247

P Rajamalli
Assistant Professor
Indian Institute of Science
Bangalore, India
E-Mail: rajamalli@iisc.ac.in
Homepage: https://profmlab.wordpress.com/

Dr. Rajamalli obtained her Ph. D. in Physical Organic Chemistry from Department of Chemistry, IIT Madras, in 2012. She then moved to NTHU, Taiwan for a post-doctoral position with Prof. Chien-Hong Cheng (2012-16). She received Marie Curie Post-doc fellowship and moved to University of St Andrews, UK and worked with Prof. Eli Zysman-Colman (2016-19). She joined IISc as an Assistant Professor in 2019.

Her research group focuses on development emitting materials for organic light emitting diodes (OLEDs) including TADF, MR-TADF emitters, carbon, quantum dots and dendrimer derived emitters for solution process. Host and electron transporting materials for highly stable devices. She start with the design of materials, synthesis, photophysical studies and end with device fabrication.

A Rigid Xanthene-Anthracene based Scaffold Exhibiting Ultra Deep-Blue Emission with CIE_y of 0.06: Multifunctional Material as Emitter and Host for blue OLEDs

P. Rajamalli

Indian Institute of Science, Bangalore
Email: rajamalli@iisc.ac.in

Ultra-deep blue fluorescent emitters with $CIE_y < 0.08$ are still in demand for achieving vibrant full-color displays. Herein, we have designed and synthesized xanthene-anthracene based PhAn-Xn, where xanthene and anthracene are linked by orthogonal phenyl bridge[1] to prevent aggregation-caused quenching (ACQ). PhAn-Xn exhibits emission maxima at 430 nm, full width at half maxima (FWHM) of 48 nm, and a prompt lifetime (τ_P) of 0.7 ns. The non-doped device exhibits electroluminescence (EL) maxima at 432 nm, a maximum external quantum efficiency (EQE_{max}) of 4.2%, with Commission Internationale de L'Eclairage (*CIE*) coordinates of (0.16, 0.06) at 8V and a maximum luminance (L_{max}) of 4,110 cd m^{-2}. The device maintains an *EQE* of 4.0% at 1,000 cd m^{-2}, retaining 95% of the maximum efficiency.[2] PhAn-Xn, demonstrating superior charge transport capabilities relative to the commonly used blue host (DPEPO), is used as the host material in organic light-emitting diode (OLED) devices by taking well-known blue dopant 4,4'-Bis(9-ethyl-3-carbazovinylene)-1,1'-biphenyl (BCzVBi). The doped device exhibits EL maxima at 455 nm, consistent with the photoluminescence (PL) spectra. An EQE_{max} of 6.5% was achieved, along with a high brightness of 41,557 cd m^{-2}. The device maintains an *EQE* of 6.4%, retaining 98% of the maximum efficiency at 1,000 cd m^{-2}. These results indicate that PhAn-Xn has multifunctionality, serving both as an emitter and a host for deep blue OLEDs.

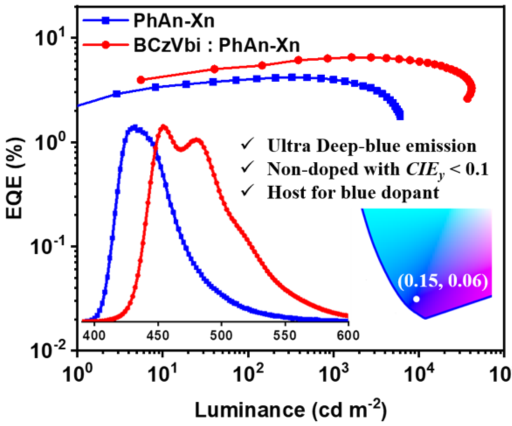


Figure 1: Schematic representation of PhAn-Xn as emitter and host.

References

[1] A. R. Khosropour, M. M. Khodaei, H. Moghannian, *Synlett* **2005**, *6*, 955.
[2] S. Tannir, R. Chavez, G. Molina, A. Tomlinson, M. Jeffries-el, *Chem. Mater.* **2024**, *36*, 4945.

BASF Session;
Chairpersons: Harish Shinde and Akhila Kumar Sahoo

Santanu Mukherjee

Professor
Department of Organic Chemistry
Indian Institute of Science
Bangalore, INDIA
E-Mail: sm@iisc.ac.in
Homepage: https://orgchem.iisc.ac.in/santanu_mukherjee/SM.htm

Santanu Mukherjee obtained his BSc (Chemistry Honors) from R. K. Mission Residential College, Narendrapur (2000) and MSc (Chemistry) from IIT, Kanpur (2002). After completing his doctoral studies with Prof. Albrecht Berkessel at Universität zu Köln in 2006, he worked as a postdoctoral fellow with Prof. Benjamin List at Max-Planck Institut für Kohlenforschung in Mülheim an der Ruhr (2006-2008) and subsequently with Prof. E. J. Corey at Harvard University (2008-2010). In 2010, he returned to India to join the Department of Organic Chemistry at Indian Institute of Science, Bangalore as an Assistant Professor. He was promoted to Associate Professor in 2015 and Professor in 2021.

Santanu is a recipient of Thieme Chemistry Journals Award (2011), Indian National Science Academy (INSA) Medal for Young Scientists (2014), Science and Technology Award for Research by Science and Engineering Research Board (SERB-STAR), and a Fellow of the Royal Society of Chemistry (2018). He is an Associate Editor of *Organic & Biomolecular Chemistry* (since 2019) and *Chemical Communications* (since 2025). He served as an Editorial Advisory Board Member of *the Journal of Organic Chemistry* (2018-23) and is currently a member of the *SYNLETT* Advisory Board.

His research group is interested in asymmetric catalysis with particular emphasis on the discovery of new enantioselective transformations and their applications to complex targets.

Symmetry Breaking Routes to Natural and Unnatural Ladderanes

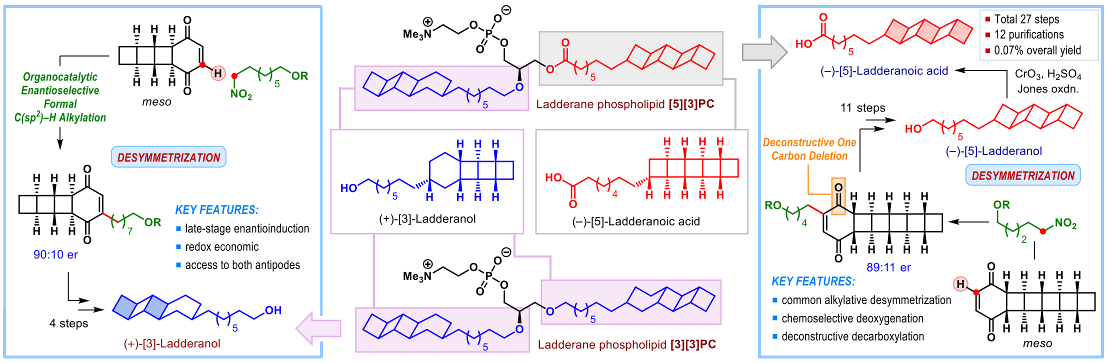
Santanu Mukherjee

Department of Organic Chemistry
Indian Institute of Science, Bangalore -560012, INDIA
E-mail: sm@iisc.ac.in

Breaking symmetry to generate asymmetry, commonly termed *desymmetrization*, is a remarkably powerful strategy for building molecular complexity. Successful implementation of this strategy holds the potential to forge multiple stereogenic centers in a single step. In fact, stereocenters can also be created away from the reaction site.

During the past few years, we have developed a number of organocatalytic enantioselective desymmetrization reactions including formal C(sp^2)–H alkylation[1] and *de novo* construction of (hetero)arenes.[2] We subsequently applied these reactions to the enantioselective synthesis complex targets.

Naturally occurring ladderane phospholipids represent a class of targets, which provided us with the motivation to develop some of these enantioselective desymmetrization reactions. This talk will focus on the application of our desymmetrizing C(sp^2)–H alkylation reaction to [3]-ladderanol,[3] [5]-ladderanoic[4] acid as well as their unnatural analogues in an effort to unravel their biosynthetic hypothesis. In addition, our recent work on the enantioselective synthesis of an unnatural benzo-analogue of [3]-ladderanol through the application of our newly developed alkoxy-directed dienamine catalysis[5] will also be discussed.



References

1. (a) Manna, M. S.; Mukherjee, S. *J. Am. Chem. Soc.* **2015**, *137*, 130. (b) Sarkar, R.; Mukherjee, S. *Org. Lett.* **2016**, *18*, 6160. (c) Mallojjala, S. C.; Sarkar, R.; Karugu, R. W.; Manna, M. S.; Ray, S.; Mukherjee, S.; Hirschi, J. S. *J. Am. Chem. Soc.* **2022**, *144*, 17399.

2. (a) Ghosh, B.; Harariya, M. S.; Mukherjee, S. *Angew. Chem. Int. Ed.* **2022**, *61*, e202204523. (b) Ghosh, B.; Balhara, R.; Jindal, G.; Mukherjee, S. *Angew. Chem. Int. Ed.* **2021**, *60*, 9086.

3. Ray, S.; Mondal, S.; Mukherjee, S. *Angew. Chem. Int. Ed.* **2022**, *61*, e202201584.

4. Ray, S.; Behera, D.; Biswas, P.; Mukherjee, S. *manuscript under preparation*.

5. Ray, S.; Behera, D.; Harariya, M. S.; Das, S.; Tarafdar, P. K.; Mukherjee, S. *J. Am. Chem. Soc.* **2025**, *147*, 2523.

Anastasios Polyzos

Associate Professor

The University of Melbourne and CSIRO
Melbourne, Australia
E-Mail: anastasios.polyzos@unimelb.edu.au
Homepage: https://www.polyzoslab.com/

Dr Anastasios (Tash) Polyzos is Associate Professor and ARC Future Fellow at the University of Melbourne. Tash completed his doctoral studies in 2005 at La Trobe University and appointed to Research Fellow at the Australian National research agency, CSIRO in the same year. In 2008 he pursued post-doctoral research at University of Cambridge under guidance of Professor Steven V. Ley FRS. In 2011 he returned to Australia and lead the flow chemistry and catalysis group at CSIRO in Australia. He then embarked on an independent career in 2015 when he was appointed to the University of Melbourne.

His group's accomplishments have been recognised by several achievements including the 2021 Grimwade Prize for Industrial Chemistry, Max O'Conner Award and Lectureship (2018), La Trobe University (2018) the Thieme Chemistry Journals Award (2017), Visiting Professorship, ETH Zurich (Swiss Federal Institute of Technology) (2016) and the Julius Career Award, CSIRO, Australia (2013).

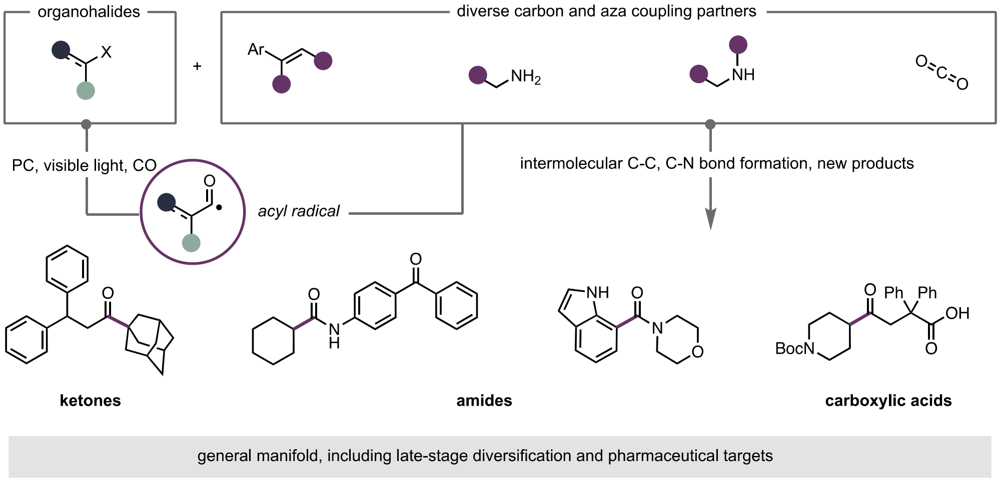
Tash's research interests include the development of new methods and enabling technologies for organic synthesis, photocatalysis, C-H reaction discovery, and the development of sustainable industrial process chemistry. He currently serves as Director of the Australian Research Council Industrial Transformation Training Centre for Chemical Industries, and founder of start-up company FlowAI.

New Strategies in Catalytic Radical Carbonylation of Organohalides

Anastasios Polyzos*[a,b]

[a]*School of Chemistry, The University of Melbourne, Victoria, Australia;* [b]*CSIRO Manufacturing, Victoria, Australia.*
E-mail: anastasios.polyzos@unimelb.edu.au

Radical carbonylation has emerged as an attractive manifold for the construction of carbon-carbon (C-C) bonds, enabling the synthesis of diverse organic molecules bearing a carbonyl functional group. Despite its tremendous potential, radical carbonylation is challenged by the availability of catalytic protocols which confer acceptable regioselectivity and functional group compatibility. Furthermore, catalytic methods that generate carbon-centred radicals from a diverse pool of feedstock chemicals remain elusive. Here we disclose the invention of protocols that combine visible light photoredox catalysis with flow chemistry for new carbonylative reactions that generate diverse amide[1], carboxylic acid and ketone[2] products. Central to this approach is multiphoton photoredox catalysis[3], which engages a potent photoreductant to enable the facile generation of acyl radical intermediates from abundant organohalides, significantly expanding potential scope and application of this reaction in chemical synthesis.



References

1. J. A. Forni, N. Micic, T. U. Connell, G. K. Weragoda, A. Polyzos, *Angew. Chem. Int. Ed.* (**2020**), *132*, 2-11.
2. Forni, J. A.; Gandhi, V. H.; Polyzos, A., *ACS Catalysis* (**2022**), *12*, 10018-10027.
3. T. U. Connell, C. L. Fraser, M. L. Czyz, Z. M. Smith, D. J. Hayne, E. H. Doeven, J. Agugiaro, D. J. D. Wilson, J. L. Adcock, A. D. Scully, D. E.Goḿez, N. W.Barnett, A. Polyzos, P. S. Francis *J. Am. Chem. Soc.* (**2019**), *141*, 17646-17658.

Srinivasarao Yaragorla
Professor
School of Chemistry
University of Hyderabad (an Institute of Eminence),
P. O. Central University, 500046,
Hyderabad, Telangana, INDIA
E-Mail: *srinivas.yaragorla@uohyd.ac.in*
Homepage: *srinivas.yaragorla@uohyd.ac.in*

Dr. Srinivasarao Yaragorla obtained his Ph. D. in Organic Synthesis from CSIR-IICT in 2008. Subsequently, he did a couple of post-doctoral stints (2008-2012) at the University of Minnesota, USA and the University of Hyderabad. He joined Central University of Rajasthan as an Assistant Professor in 2012 and moved to the University of Hyderabad in 2017. Currently, he is a full professor at the School of Chemistry, University of Hyderabad.

He has been contributing significantly in diverse areas of organic chemistry with a special emphasis on sustainable synthetic chemistry. His group works on Cyclizative functionalization of alkynols, Propargyl-Claisen rearrangement, C–H functionalization, strain-induced reactions of donor-acceptor cyclopropanes, Multicomponent cyclization of a-imino ketones triggered by Friedl-Crafts arylation and Mechanochemistry. His group is one of the very few groups that introduced highly abundant, less toxic, biodegradable alkaline earth catalysts, such as Calcium-catalysis, as sustainable Lewis acids for a variety of organic transformations. He has more than 88 publications, 8 students have already been awarded Ph. D. degrees under his able guidance, and 10 post-doctoral associates have worked in his group along with many master’s interns.

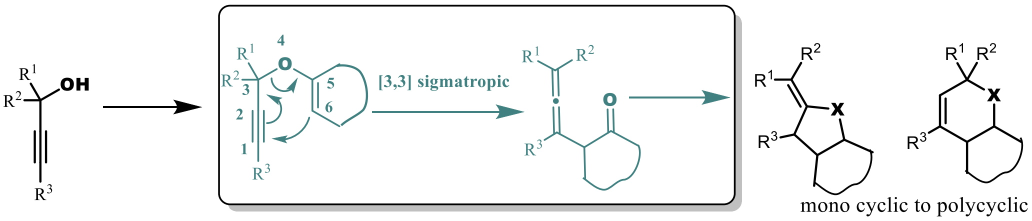
His research and teaching contributions were recognised with the Chancellor’s Award (UoH), Associateship of the Indian Academy of Sciences and Telangana Academy of Sciences, Prof. S. Jaya Rami Reddy Excellence Award (by SV Univ.), Best Performance Award by (CU-Rajasthan). He was invited to speak on his research contributions at many national and international conferences.

Propargyl-Claisen Rearrangement: Beyond Allenes

Dr. Srinivasarao Yaragorla

School of Chemistry, University of Hyderabad (an Institute of Eminence), P. O. Central University, 500046,
Hyderabad, Telangana, India
Email: srinivas.yaragorla@uohyd.ac.in

Claisen rearrangement[1] is one of the fundamental reactions of organic chemistry that is described as the [3,3]-sigmatropic transformation of allyl vinyl ether into g, d-unsaturated carbonyl compound. Many variations of this reaction are known regarding the substitution pattern of the vinyl group or the introduction of an aryl group, heteroatoms (most commonly Nitrogen or Sulphur) or a propargyl group. After fifty years of the first report by Claisen, it was in 1963 that the first successful attempts at rearranging a propargyl aryl ether were reported.[2] Next, aliphatic propargylic Claisen rearrangement was reported in 1965.[3] Nowadays, Propargyl Claisen rearrangement is an excellent protocol for accessing many functionalized allenes through the [3,3]-sigmatropic transformation of propargyl vinyl ethers 3 (Scheme 1). However, allenes are excellent intermediates en route to other arrays of functional groups. Indeed, a wide range of important organic compound classes have been synthesised this way. More importantly, they are often synthesized without the need to isolate the allene intermediates via domino reactions that always begin with the Claisen rearrangement.[4] We have developed a one-pot domino/sequential cyclization reaction to construct a variety of important privileged molecules through Propargyl-Claisen rearrangement commencing from readily preparable propargyl alcohols and ambident enols using sustainable Ca(II) based Lewis acid catalysts.[5]



Calcium(II)-Catalysis, Highly General and DOMINO reactions

Figure 1. Schematic representation of Propargyl-Claisen Rearrangement

References

1) L. Claisen, *Chem. Ber.*, **1912**, *45*, 315
2) B. S. Thyagarajan, K. K. Balasubramanian, R. B. Rao, *Tetrahedron Lett.*, **1963**, *21*, 1393–1398
3) D. K. Black, S. R. Landor, *J. Chem. Soc.*, **1965**, 6784–6788.
4) (a) D. Tejedor, G. Mendez-Abt, L. Cotos and Fernando Garcıa-Tellado, *Chem. Soc. Rev.*, **2013**, *42*, 458. (b) A.V. Listratova, A. A. Titov, A. Y. Obydennik, A. V. Varlamov. *Tetrahedron*, **2022**, *121*, 132914.
5) Our contributions to Propargyl Claisen Rearrangement. (a) *Adv. Synth. & Catal.***2017**, 359, 3068-3075. (b) *Tetrahedron Lett*. **2017**, *58*, 4642-4647. (c) *Adv. Synth. Catal*. **2018**, *360*, 4422 – 4428. (d) *Org. Biomol. Chem.*, **2018**, *16*, 7920-7925. (e) *Org. Biomol. Chem.*, **2019**, *17,1924-1928.* (f) *Eur. J. Org. Chem*. **2019**, 5740–5748. (g) *Eur. J. Org. Chem.* **2020,** 2199-2209. (h) *Adv. Synth. Catal*. **2021**, *363*, 5486-5492. (i) *ACS Omega*, **2022**, 7, 34693–34706. (j) *J. Org. Chem.* **2023**, *88*, 9, 5457–5472. (k) *J. Org. Chem.* **2024**, *89*, 34–43.

Kalyaneswar Mandal
Associate Professor
TIFR Hyderabad
Hyderabad-500 046, INDIA

E-Mail: kmandal@tifrh.res.in
Homepage: https://www.tifrh.res.in/~kmandal/

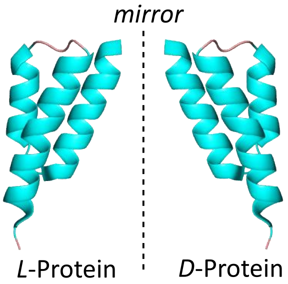
Dr. Kalyaneswar Mandal is an Associate Professor of Chemistry and Chemical Biology at the Tata Institute of Fundamental Research (TIFR) Hyderabad. He earned his Ph.D. in synthetic organic chemistry from the Indian Institute of Technology Bombay. After completing his Ph.D., he worked at The University of Chicago, first as a Postdoctoral Fellow and later as a Research Professional Associate (Research Faculty position). In 2016, he joined the esteemed TIFR faculty. Dr. Mandal is a distinguished recipient of the DBT/Wellcome Trust India Alliance Intermediate Fellowship award. He is also an editorial board member of the International Journal of Peptide Research and Therapeutics. His research is primarily centered around chemical peptide and protein synthesis, complemented by biophysical techniques. His work aims to unravel and manipulate the underlying molecular mechanisms governing protein function.

Exploring Reciprocal Chiral Specificity to Inhibit Red Blood Cell Invasion by Malaria Parasites

Dr. Kalyaneswar Mandal

Tata Institute of Fundamental Research Hyderabad
Email: kmandal@tifrh.res.in

The interaction between two crucial parasite proteins, apical membrane antigen 1 (AMA1) and rhoptry neck protein 2 (RON2), plays a pivotal role in the formation of the moving junction – a critical step that initiates malaria parasite entry into human erythrocytes. Identifying a suitable small protein to inhibit the interaction between AMA1 and the extracellular domain of RON2 would represent an ideal strategy for disrupting the junction formation, and consequently, halting the invasion process. We utilize synthetic organic chemistry tools and biological display techniques to systematically identify mirror-image protein (D-protein) molecules with the potential to interfere with AMA1-RON2 interactions. D-proteins are resistant to proteolysis and less immunogenic. Therefore, a suitably engineered D-protein molecule, composed entirely of D-amino acids and glycine, would stand as a superior option for antimalarial therapeutic use compared to conventional natural peptides or proteins.[1-5]



References

1. J. Mannuthodikayil, S. Singh, A. Biswas, A. Kar, W. Tabassum, P. Vydyam, M. K. Bhattacharyya, K. Mandal, *Org. Lett.* **2019**, *21*, 9040-9044.
2. A. Kar, J. Mannuthodikayil, S. Singh, A. Biswas, P. Dubey, A. Das, K. Mandal, *Angew. Chem. Int. Ed.*, **2020**, *59*, 14796-14801.
3. J. Mannuthodikayil, S. Sinha, S. Singh, A. Biswas, I. Ali, P. C. Mashurabad, W. Tabassum, P. Vydyam, M. K. Bhattacharyya, K. Mandal, *ChemBioChem*, **2023**, *24*, e202200533.
4. A. Biswas, A. Narayan, S. Sinha, K Mandal, *bioRxiv*, **2023**.06. 23.546305.
5. A. Kar, A. Narayan, V. Malik, K. Mandal, *RSC Chem. Biol.*, **2025**, *6*, 65-72.

Benudhar Punji
Senior Principal Scientist
CSIR-National Chemical Laboratory
Pune, INDIA
E-Mail: b.punji@ncl.res.in
Homepage: http://academic.ncl.res.in/b.punji

Dr. Punji is a Senior Principal Scientist at the CSIR-National Chemical Laboratory, Pune and a Professor at the Academy of Scientific & Innovative Research (AcSIR), New Delhi. Dr. Punji received Ph.D. from the Indian Institute of Technology Bombay (IITB), Mumbai, under the supervision of Prof. M. S. Balakrishna. Upon graduation, he worked as a post-doctoral fellow with Prof. Alan S. Goldman at the Rutgers University, USA and then as Alexander von Humboldt post-doctoral fellow with Prof Lutz Ackermann at the University of Göttingen, Germany.

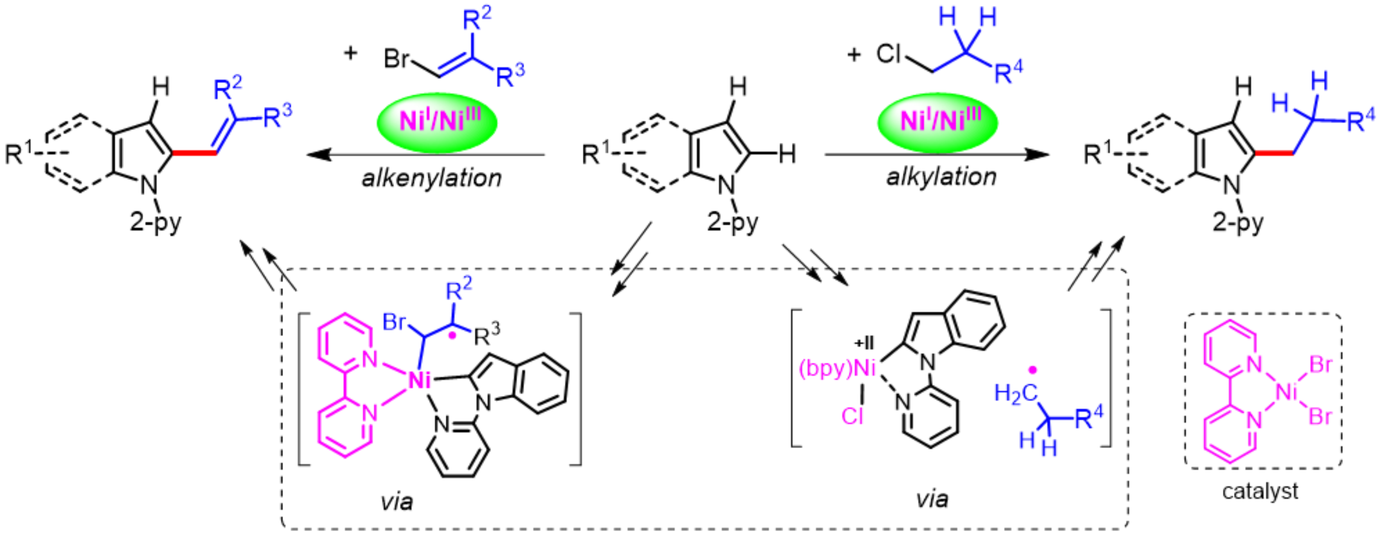
His research interest includes, development of novel and sustainable 3d transition metal catalysts for C-H functionalizations, asymmetric hydrogenation and (de)hydrogenative transformations. His focus is mostly on mechanistic-based homogeneous catalysis and organometallic chemistry. Dr. Punji has published more than 85 research papers, and he has 15 patents and 10 book chapters to his credit.

C-H Alkylation of Heteroarenes Using Unactivated Alkyl Halides Enabled by Iron and Nickel Catalysts

Dr. Benudhar Punji

CSIR-National Chemical Laboratory, Pune
Email: b.punji@ncl.res.in

Developing transition metal catalysts based on earth-abundant metals is important to attain sustainable and environmentally benign chemical transformation. In this direction, transition metal catalysts based on iron and nickel have been given considerable attention, particularly for the C−H bond functionalization of biorelevant heteroarenes. To this end, our research activities have been focused on the design and development of suitably ligated nickel catalysts for selective C-H alkylation of indoles, azoles and pyridones using unactivated alkyl halides.[1-3] In this presentation, Ni-catalyzed regioselective C-H bond alkylation and alkenylation of indoles, azoles and pyridones will be discussed. In addition, the focus will be paid to the mechanistic aspects of these reactions. Moreover, the use of iron complexes in the functionalization of indole derivatives will be deliberated.[4] Overall, a comprehensive catalyst development, catalytic scope, and reaction mechanism of the Fe- and Ni-catalyzed functionalization of indoles, azoles and pyridones will be discussed.



References

1. Pandey, D. K.; Ankade, S. B.; Ali, A.; Vinod, C. P.; Punji, B. *Chem. Sci.* **2019**, *10*, 9493.
2. Jagtap, R. A.; Samal, P. P.; Vinod, C. P. Krishnamurty, S.; Punji, B. *ACS Catal.* **2020**, *10*, 3712.
3. Ankade, S. B.; Shabade, A. B.; Soni, V. and Punji, B. *ACS Catal.* **2021**, *11*, 3268.
4. Pradhan, C.; Jagtap, R. A.; Samal, P. P.; Krishnamurty, S.; Punji, B. *Green Chem.* **2023**, *25*, 9733.

Sun Pharma Session; Chairpersons: Sivapriya K. and T. Punniyamurthy

Alakesh Bisai, FRSC, FNASc
Professor of Chemistry
IISER Kolkata, Mohanpur, WB

Former Professor & Dean of Faculty Affairs
IISER Bhopal (2009-2019), MP
Email: alakesh@iiserkol.ac.in; alakeshb@gmail.com
WWW: https://www.iiserkol.ac.in/~alakesh/alakesh.html

PhD @ **IIT Kanpur**, UP, INDIA (Supervisor: Prof. Vinod K. Singh)
Postdoc @ **University of California, Berkeley**, CA, USA (Mentor: Prof. Richmond Sarpong)

Independent Career:
@IISER Bhopal (2009 – 2020) & @IISER Kolkata (2019 – till date)

Research Focus:
Strategies for Structurally Intriguing Marine Natural Product of Biological Relevance. Biomimetic approaches. The AB research group's total synthesis has been highlighted in '*Organic Chemistry Portal*' as '*The Bisai Synthesis of (-)-Physovenine*' (**2018**) and '*The Bisai Synthesis of Lycoramine*' (**2023**).

Representative Publications:
Chem. Sci. **2022**, *13*, 11666; *Chem. Commun.* **2022**, *58*, 3929; *Chem. Sci.* **2023**, *14*, 8047; *ACS Catal.* **2023**, *13*, 2118; *Chem. Commun.* **2024**, *60*, 9737; *Org. Lett.* **2024**, *26*, 8643; *Chem. Sci.* **2024**, *15*, 9164; *Chem. Sci.* **2024**, *15*, 14946; *Org. Lett.* **2024**, *26*, 10803; *Chem. Sci.* **2024**, *15*, 19851; *Org. Lett.* **2025**, *27*, 1531; *JACS Au*, **2025**, https://doi.org/10.1021/jacsau.4c01276

Position held:
- Professor (May 2019 - till date): Dept. of Chemical Sciences, IISER Kolkata
- Professor (2018 - 2020): Dept. of Chemistry, IISER Bhopal; Associate Professor (2013 – 2018); Assistant Professor (2009 – 2013)
- Post-Doctoral (2006 –2009): Dept. of Chemistry, UC Berkeley, CA, USA.

Awards & Recognitions:
- Fellow, The National Academy of Sciences (NASI), (FNASc, Oct., 2024)
- Fellow, Royal Society of Chemistry (FRSC), (March 2023)
- STARS-MoE 2023 Research Grant
- 'CDRI Award' 2022 for Excellence in Drug Research (2022)
- Prof. Dhananjay Nasipuri Memorial Lecture 2021 (ICS)
- Silver Medal, Chintan Rasayan Sanstha (CRS) 2021 (June 2021)
- Fellowship, 'SERB-STAR' (FSTR - 2021-2024)
- 'Bronze Medal', CRSI, India (July 2020)
- Fellow, Indian Chemical Society (FICS), (July 2020)
- Young Scientist Award by CRSI, India (July, 2018)
- Young Scientist Award by the BRNS, DAE (2011-2014)
- DST Fast-Track Project (March, 2013) for Young Scientist

Total Synthesis of Complex Natural Products of Biological Relevance

Alakesh Bisai*

Department of Chemical Sciences, IISER Kolkata, Mohanpur, WB; e-mail: alakesh@iiserkol.ac.in

The natural product chemical diversity is more closely aligned with drugs than synthetic libraries, thus making them ideal candidates for drug discovery projects.[1-2] Marine organisms can be considered the most recent source of bioactive natural products in relation to terrestrial plants and nonmarine microorganisms.[3-4] In the above context, naturally occurring alkaloids with impressive diversity of biological activities drew our interest for the development of bio-inspired strategies. [5-6] Towards this, we explored novel strategies that will be discussed in this talk.

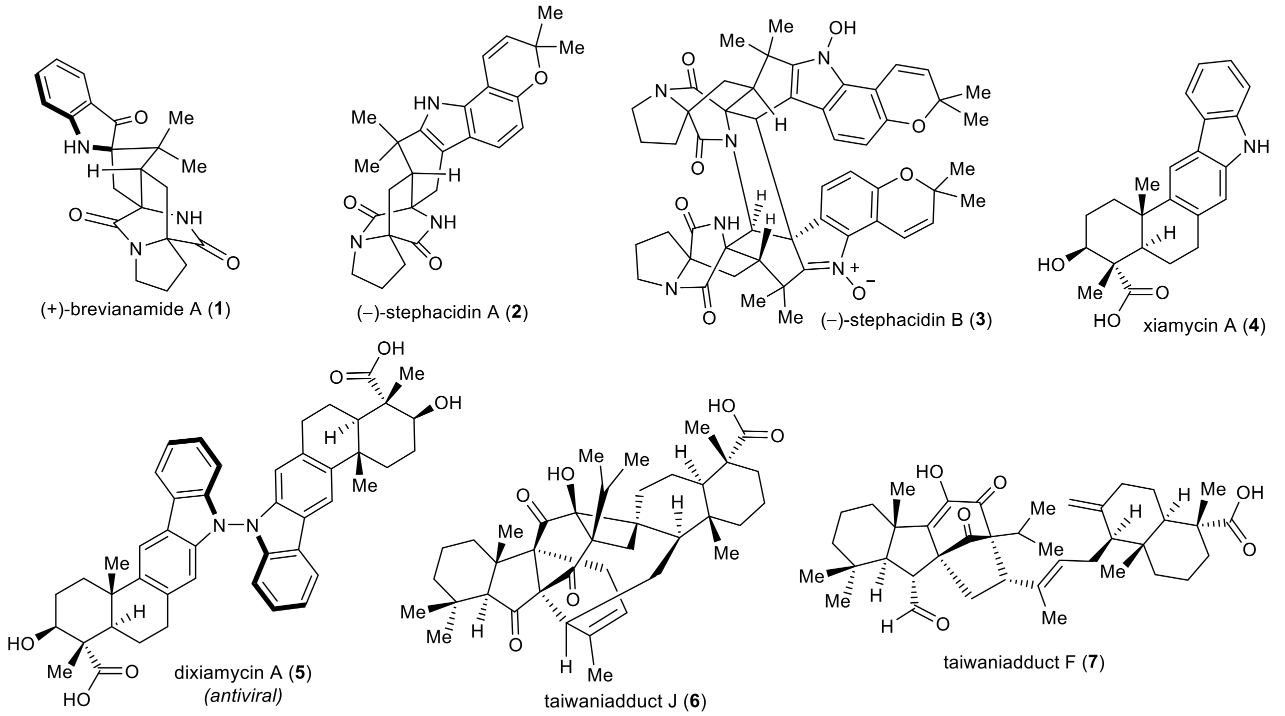


Figure. Architecturally intriguing marine alkaloids of biological relevance.

References

1. (a) C. Jiménez *ACS Med. Chem. Lett.* **2018**, *9*, 959 (Marine Products in Medicinal Chemistry). (b) S. Kundu, D. Jana, N. Mandal, A, Mondal, A. Dutta, A. Bisai *Chem. Sci.* **2024**, *15*, 14946.
2. (a) M. Munda, R. Nandi, S. Kundu, V. R. Gavit, S. Niyogi, A. Bisai *Chem. Sci.* **2022**, *13*, 11666. (b) S. Niyogi, A. Mondal, M. Nandy, A. Bisai, *Org. Lett.* **2024**, *26*, 8643.
3. (a) A. Khatua, P. Shyamal, S. Pal, A. Mondal, A. Bisai, *Chem. Commun.* **2022**, *58*, 3929. (b) S. Sharma, S. Shaheeda, K. Shaw, A. Bisai, and A. Paul, *ACS Catal.* **2023**, *13*, 2118.
4. (a) R. Nandi, S. Niyogi, S. Kundu, V. R. Gavit, M. Munda, A. Bisai *Chem. Sci.* **2023**, *14*, 8047. (b). M. Munda, A. Mondal, N. K. Roy, R. Murmu, S. Niyogi, A. Bisai *Chem. Sci.* **2024**, *15*, 9164. (c) R. Nandi, R. Murmu, S. Sadhukhan, D. Pal, S. Biswas, A. Bisai, *Org. Lett.* **2025**, *27*, 1531.
5. (a) R. Murmu, S. Kundu, M. Majhi, S. Pal, A. Mondal, A. Bisai, *Chem. Commun.* **2024**, *60*, 9737. (b) M. Nandy, A. Das, S. Niyogi, A. Khatua, D. Jana, A. Bisai, *Org. Lett.* **2024**, *26*, 10424.
6. (a) S. Pal, S. Majumder, P. Shyamal, D. Mondal, B. Das, A. Bisai *Chem. Sci.* **2024**, *15*, 19851. (b) D. Jana, A. Khatua, S. Kundu, S. Noskar, M. Nandy, A. Bisai *JACS Au*, **2025**, doi.org/10.1021/jacsau.4c01276.

Rene M. Koenigs

Professor
RWTH Aachen University
Aachen, GERMANY
E-Mail: rene.koenigs@rwth-aachen.de
Homepage: www.koenigslab.rwth-aachen.de

Academic experience

RWTH Aachen University, Institute of Organic Chemistry, Landoltweg 1, 52074 Aachen, Germany

Nov. 2024	Call for a Chair Professor for Organic Chemistry at Bayreuth University
Since May 2022	Professor for Organic Chemistry
2023 – 2024	Visiting professor at IIT Bombay, India
2017 – *2020*	Visiting professor at UNSW Sydney, Australia
2015 – 2022	Assistant professor for Organic Chemistry

Main Research Areas: Organic synthesis, photochemistry, carbene transfer reactions, nitrene transfer reactions, reactive intermediates, catalysis, method development, medicinal chemistry.

Professional experience

Grünenthal GmbH, Global Drug Discovery, 52099 Aachen, Germany

2013 – 2015	Head of Laboratory in Lead Optimization Chemistry
2011 – 2013	*Post-Doc* in Lead Optimization Chemistry

Education

PhD thesis

2008 – 2011	PhD thesis under the supervision of Prof. Dr. M. Rueping, Goethe Universität, Frankfurt/M. then RWTH Aachen University (*Summa cum laude*, 1.0)

Spin states matter - fundamentals, applications and translation to drug discovery

Rene M. Koenigs

RWTH Aachen University
Email: rene.koenigs@rwth-aachen.de

Carbenes and nitrenes are versatile reactive intermediates that find widespread application in organic synthesis. Their high reactivity, however, often necessitates the use of metal complexes for stabilization of such species.[1,2]

Herein, we describe our recent approaches towards photochemical and photocatalytic carbene and nitrene transfer reactions. Strategies in accessing either singlet or triplet carbenes will be discussed and their applications in synthesis methodology will be presented.[3,4]

We commence with a discussion of nitrene intermediates and how these can be accessed under visible light irradiation without the need of conventional metal catalysts. We describe strategies, how the access of nitrene intermediates can be manipulated by single electron transfer reactions or direct photoexcitation.[5] We conclude with a discussion of a collaborative approach towards drug discovery, where fundamental discoveries can be translated into new drugs and medicines.[6]

References

[1] (a) Davies, H. M. L.; Manning, J. R.; *Nature* **2018**, *451*, 417; (b) Ford, A.; Miel, H.; Ring, A.; Slattery, C. N.; Maguire, A. R.; McKervey, M. A.; *Chem. Rev.* **2015**, *115*, 9981.

[2] (a) Ciszewski, L. W.; Rybicka-Jasińska, K.; Gryko, D. *Org. Biomol. Chem.* **2019**, *17*, 432; (b) Yang, Z.; Stivanin, M. L.; Jurberg, I. D.; Koenigs, R. M. *Chem. Soc. Rev.* **2020**, *49*, 6833; (c) Empel, C.; Pei, C.; Koenigs, R. M. *Chem. Commun.* **2022**, *58*, 2788.

[3] (a) Jana, S.; Pei, C.; Empel, C.; Koenigs, R. M. *Angew. Chem. Int. Ed.* **2021**, *60*, 13271-13279; (b) Jana, S.; Yang, Z.; Li, F.; Empel, C.; Ho, J.; Koenigs, R. M. *Angew. Chem. Int. Ed.* **2020**, *59*, 5562-5566; (c) Hommelsheim, R.; Guo, Y.; Yang, Z.; Empel, C.; Koenigs, R. M. *Angew. Chem. Int. Ed.* **2019**, *58*, 1203-1207.

[4] (a) Li, F.; Pei, C.; Koenigs, R. M.; *Angew. Chem. Int. Ed.* **2022**, *61*, e202111892; (b) Empel, C.; Jana, S.; Ciszewski, Ł.; Zawada, K.; Pei, C.; Gryko, D.; Koenigs, R. M. *Chem. Eur. J.* **2023**, e202300214. (c) De Angelis, L.; Pei, C.; Koenigs, R. M.; Doyle, M. P. *Nature Commun.* **2023**, *14*, 1109.

[5] (a) Guo, Y.; Pei, C.; Koenigs, R. M. *Nature Commun.* **2022**, *13*, 86; (b) Guo, Y.; Pei, C.; Jana, S.; Koenigs, R. M. *ACS Catal.* **2021**, *11*, 337; (c) Guo, Y.; Empel, C.; Pei, C.; Fang, H.; Koenigs, R. M. *Chem Catalysis*, **2022**, *2*, 2012; (d) Empel, C.; Koenigs, R. M.; *Chem Catalysis*, **2022**, *2*, 2506.

[6] (a) Hussain, Y.; Prasanna R.; Empel, C.; Proschak, E.; Koenigs, R. M.; Chauhan, P. *Angew. Chem. Int. Ed.* **2024**, e202416956. (b) Li, F.; Zhu, W. F.; Empel, C.; Datsenko, O.; Xu, Y.; Ehrler, J. M.; Atodiresei, I.; Knapp, S.; Mykhailiuk, P.; Proschak, E.; Koenigs, R. M. *Science*, **2024**, *383*, 498-503.

T. Govindaraju, Ph.D.
Professor
Bioorganic Chemistry Laboratory, New Chemistry Unit
Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR)
Jakkur P.O., Bengaluru 560064, India
Email: tgraju@jncasr.ac.in
URL: https://www.jncasr.ac.in/faculty/tgraju

T. Govindaraju obtained his MSc from Bangalore University in 2000 and his Ph.D. from the National Chemical Laboratory, Pune, India, in 2006. He pursued postdoctoral research at the University of Wisconsin-Madison, USA (2005–2006), and the Max Planck Institute of Molecular Physiology, Dortmund, Germany (2006–2008). Since 2008, he has been a faculty member at JNCASR, Bengaluru, where he also served as Chair of the Educational Technology Unit. His research interests are at the interface of chemistry, biology, and biomaterials science, with a focus on Alzheimer’s disease, peptide chemistry, molecular probes, redox biology in disease pathogenesis, theranostics, molecular architectonics. He has over 180 publications, 35 patents, and four books to his credit. He founded VNIR Biotechnologies Pvt. Ltd. (http://vnir.life) to commercialize his laboratory inventions. Notably, he discovered a promising drug candidate for Alzheimer’s disease, which has been licensed to a biopharma for further development. Govindaraju is the recipient of several awards and honors, including the Shanti Swarup Bhatnagar Prize (2021) and the National Technology Award (2023) from the Government of India. He is also dedicated to science education through various outreach programs.

Multifaceted Approaches to Mitigating Alzheimer's Disease

T. Govindaraju

Bioorganic Chemistry Laboratory, New Chemistry Unit, Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), Jakkur P.O., Bengaluru-560064, Karnataka, India.
E-mail: tgraju@jncasr.ac.in

Alzheimer’s disease (AD) is a multifactorial neurodegenerative disorder and a leading cause of dementia. Despite extensive research, effective diagnostic and therapeutic options for AD remain elusive. The hallmark features of AD include the production, accumulation, misfolding, and aggregation of amyloid-β (Aβ) and tau proteins in the brain. This pathological condition is exacerbated by elevated levels of reactive oxygen, nitrogen and sulfur species (RONSS), leading to biomolecular and mitochondrial damage, and resulting in oxidative stress within neuronal cells. Furthermore, oxidative stress, mitochondrial dysfunction, ferroptosis, neuroinflammation, and the role of microglia significantly contribute to the pathogenesis of AD. In this talk, I will discuss the latest insights into the complex mechanisms underlying AD. I will present comprehensive and multifaceted strategies developed in our laboratory aimed at understanding and mitigating this chronic neurodegenerative disease.

References

1. Alzheimer's Association, *Alzheimers. Dement*., **2022**, *18*, 700-789.
2. T. Govindaraju (Ed.) (2022) Alzheimer’s disease: recent findings in pathophysiology, diagnostic and therapeutic modalities, The Royal Society of Chemistry, London.
3. M. Ramesh and T. Govindaraju, *Chem. Sci*., **2022**, *13*, 13657-13689.
4. P. Baruah, D. Padhi, H. Moorthy, M. Ramesh, and T Govindaraju, *RSC Chem. Biol*., **2025**, DOI: 10.1039/D5CB00006H
5. S. Samanta, *et al*., *Adv. Therap*. **2021**, *4*, 2170007
6. P. Baruah, H. Moorthy, M. Ramesh, D. Padhi and T. Govindaraju. *Chem. Sci*., **2023**, *35*, 9427-9438.
7. D. Padhi, P. Baruah, H. Moorthy, M. Ramesh and T. Govindaraju, *Redox Biol*., **2024**, *71*, 103119.
8. S. Mandal, M. Ramesh and T. Govindaraju, *J. Med. Chem*. **2025** https://doi.org/10.1021/acs.jmedchem.4c02158

Indresh Kumar

Professor

Birla Institute of Technology & Science, Pilani (BITS Pilani)

Dr. Indresh Kumar is currently a Professor at the Birla Institute of Technology & Science, Pilani (BITS Pilani). After completing his PhD (Chemistry) from the National Chemical Laboratory (CSIR), Pune, he did his post-doctoral research work with Prof. Yujiro Hayashi at Tokyo University of Sciences, Tokyo. He worked as a Lecturer at SMVDU, Katra (J&K) before joining BITS Pilani in 2012.

Dr. Kumar is the recipient of the Award “CRSI Bronze Medal-2024 by the Chemical Research Society of India (CRSI-India)’; The ISCB Young Scientist Award in Chemical Sciences-2016” from the Indian Society of Chemists and Biologists, Lucknow”; “Professor D.K. Banerjee Memorial Lecture Award-2016” from the Department of Organic Chemistry, IISc, Bangalore. His research and teaching contribution was also recognized by BITS Pilani through the Award of "Outstanding Potential for Excellence in Research and Academics (OPERA)" during 2015-19. He is a Life Member of the Indian Society of Chemists and Biologists, Lucknow, and the Chemical Research Society of India, Bangalore. His main research interests are asymmetric organocatalysis, the development of new synthetic methodology, total synthesis of biologically active compounds and organic electrosynthesis.

Asymmetric Synthesis of Bridged Nitrogen Heterocycles by Exploring the Potential of 3-Oxindolium Ion Intermediate

Indresh Kumar

Department of Chemistry, Birla Institute of Technology and Science, Pilani
Pilani-campus 333 031 (Rajasthan) India
Email: indresh.kumar@pilani.bits-pilani.ac.in, indresh.chemistry@gmail.com

The development of new catalytic asymmetric synthesis of structurally rigid bridged Nitrogen heterocycles, which are essential units to many complex natural products, is a fascinating area of research for synthesis chemists.[1] Interestingly, these sp^3-rich saturated bridged heterocycles could be bioisosteres of medicinally important flat and fundamental units through the concept of "escape from flatland" in medicinal chemistry.[2] In this direction, 2,6-diazabycyclo[2.2.2]octane (2,6-DABCO) could be considered saturated bridged pyrimidine analogues. However, this is yet to be realized because accessing this unit via double aza-cyclization represents considerable synthetic challenges, especially in an asymmetric fashion.[3] Recently, we have developed a stimulating and straightforward method to access bridged polycyclic 2,6-DABCO units under organocatalytic circumstances.[4] The one-pot domino process procedure through the in-situ generation of a unique 3-oxindole ion was found to be essential for this challenging transformation. The design and details of this concept and synthetic strategy to access chiral 2,6-DABCO and other bridged N-heterocyclic systems will be presented here.

References

[1] a) S. R. Rajski, R. M. Williams, *Chem. Rev*. **1998**, *98*, 2723; b) R. M. Kariba, P. J. Houghton, A. Yenesew, *J. Nat. Prod*. **2002**, *65*, 566; c) X. Zhang, *Nat. Prod. Rep*. **2024**, *41*, 784.
[2] a) F. Lovering, J. Bikker, C. Humblet, *J. Med. Chem*. **2009**, *52*, 6752; b) F. Lovering, *Med. Chem. Commun*. **2013**, *4*, 515; c) O. O. Grygorenko, D. M. Volochnyuk, B. V. Vashchenko, *Eur. J. Org. Chem*. **2021**, 6478.
[3] M. M. Sanchez Duque, O. Baslé, Y. Génisson, J. C. Plaquevent, X. Bugaut, T. Constantieux, J. Rodriguez, *Angew. Chem. Int. Ed*. **2013**, *52*, 14143.
[4] J. Yadav, A. Patel, A. J. Dolas, E. Iype, K. Rangan, I. Kumar**;** *Angew. Chem. Int. Ed*. **2024**, e202416042.

Dr. Chandrakumar Appayee
Professor
Department of Chemistry
Indian Institute of Technology Gandhinagar
Palaj, Gandhinagar-382055
India

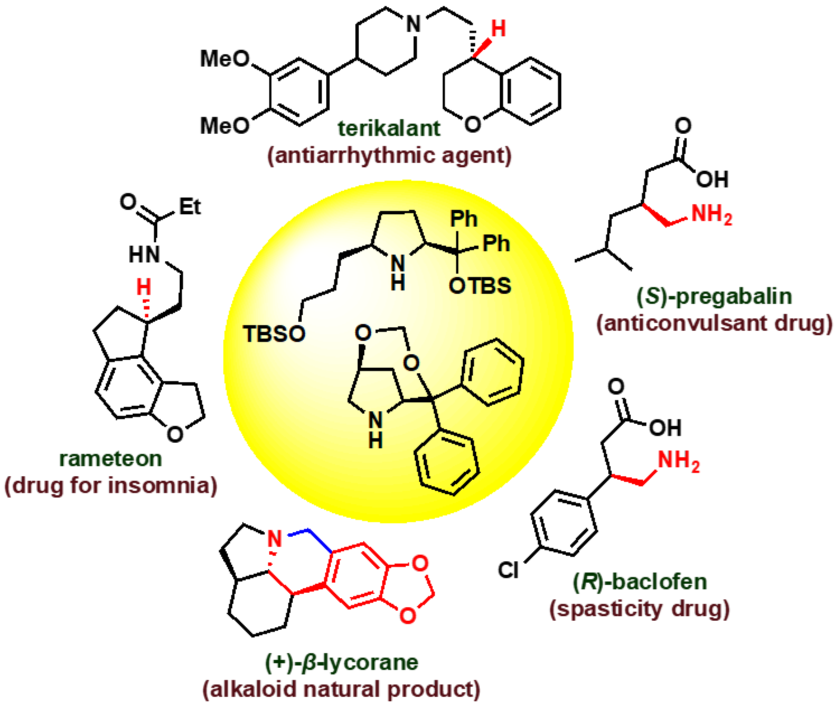
E-Mail: a.chandra@iitgn.ac.in
Group Homepage: https://appayee.people.iitgn.ac.in

Dr. Chandrakumar Appayee is currently a Professor in the Department of Chemistry, Indian Institute of Technology Gandhinagar (2024-present). Previously, he was an Associate Professor (2020-2024) at the same Department. Dr. Appayee has joined the institute as an Assistant Professor (2013-2020), after the completion of his postdoctoral research with Prof. Ronald Breslow at Columbia University, New York, USA (2012-2013). Earlier, he was a postdoctoral researcher in the research group of Prof. Stacey E. Brenner-Moyer at Brooklyn College and the City University of New York, USA (2009-2012), and in the research group of Prof. Norito Takenaka at the University of Miami, USA (2008-2009). He has obtained his Ph.D. (2008) from Indian Institute of Science, Bangalore, India for his research work carried out under the supervision of Prof. Kavirayani R. Prasad. Dr. Appayee's research interest is in the area of asymmetric organocatalysis and asymmetric synthesis of bioactive natural products and drugs.

Development of chiral secondary amine organocatalysts and their applications

Chandrakumar Appayee
Professor, Department of Chemistry, Indian Institute of Technology Gandhinagar, India

Asymmetric catalysis is the most attractive method to access single enantiomer drugs. Asymmetric organocatalysis is an important tool for the synthesis of several bioactive chiral molecules as they are usually inexpensive, non-toxic, insensitive to moisture and air, and environment friendly. Asymmetric secondary amine organocatalysis has been extensively used for multicomponent, tandem, or domino-type multistep reactions due to the generation of multiple reactive intermediates during the reaction. L-Proline and their derivatives such as silyl protected diarylprolinols (Hayashi–Jørgensen catalysts), and Macmillan catalysts are considered as the privileged catalysts due to their outstanding levels of enantiodiscrimination in a wide range of organic transformations. However, the catalyst decomposition, higher catalytic loading (usually 20 mol %), and poor regioselectivity are the major challenges associated with the secondary amine organocatalysis. To address these limitations, novel chiral secondary amine organocatalysts were developed in our laboratory.[1,2] The application of these catalysts to the key organic transformations, and the concise asymmetric synthesis of pharmaceutical drugs and natural products were also demonstrated. In this talk, I would like to discuss the challenges associated with the development of chiral secondary amine organocatalysts and their application to the asymmetric synthesis of bioactive molecules.



References

1. Kumar, R.; Maurya, V.; Avinash, A.; Appayee, C. *J. Org. Chem.* **2024**, *89*, 8586–8600.
2. Singh, S.; Kumar, R.; Dubey, N.; Appayee, C. *Chem. Commun.* **2024**, *60*, 8768–8771.

Participants

Name		Affliation
1.	Prof. Goverdhan Mehta	NOST Trustee
2.	Mrs Ranjana Mehta	Accompanying Person
3.	Prof. Ganesh Pandey	NOST Trustee
4.	Mrs. Pandey	Accompanying Person
5.	Prof. S. Chandrasekaran	NOST Trustee
6.	Dr. Jayanti Chandrasekaran	Accompanying Person
7.	Prof. Vinod Singh	NOST Trustee
8.	Mrs. Anjali Singh	Accompanying Person
9.	Prof. J. S. Yadav	NOST Trustee, Indrasheel University, Ahmedabad
10.	Mrs. Yadav	Accompanying Person
11.	Prof. Shu Kobayashi	University of Tokyo, Japan
12.	Mrs. Kobayashi	Accompanying Person
13.	Prof. Krishna P Kaliappan	Chairperson-NOST Council
14.	Dr. Snehalatha Kaliappan	Accompanying Person
15.	Dr. Srinivas Reddy	NOST Council Member
16.	Dr. Vidya Ramadas	Enveda Biosciences, Hyderabad
17.	Prof. Alakesh Bisai	IISER Kolkata
18.	Dr. Vishnu Maya Bisai	Indrasheel University
19.	Prof. Anastsios Polyzos	University of Melbourne, Australia
20.	Prof. Rene Koenigs	RWTH Aachen, Germany
21.	Prof. Peter Seeberger	Max Planck Institute, Potsdam, Germany
22.	Prof. Shoubhik Das	University of Bayreuth, Germany
23.	Prof. Alexander Zografos	Aristotle University of Thessalonik, Greece
24.	Prof. Hirohasi Ohmiya	Kyoto University, Japan
25.	Prof. Sunkyu Han	KAIST, South Korea
26.	Prof. David Sarlah	Rice University, USA
27.	Prof. Uttam Tambar	UT Southwestern Medical Center, USA
28.	Prof. Scott Snyder	University of Chicago, USA

29.	Prof. George O'Doherty	Northeastern University, Boston, USA
30.	Prof. Jerome Lacour	University of Geneva, Switzerland
31.	Prof. Stellios Arseniyadis	Queen Mary University, London
32.	Prof. Srinivas Oruganti	NOST Council Member
33.	Prof. T. Punniyamurthy	NOST Council Member
34.	Prof. Santosh J. Gharpure	IIT Bombay
35.	Prof. Srinivas Hotha	IISER Pune
36.	Prof. G. Sekar	IIT Madras
37.	Prof. Suvarn Kulkarni	IIT Bombay
38.	Prof. Chandra M. Volla	IIT Bombay
39.	Dr. Ch. Raji Reddy	CSIR-IICT, Hyderabad
40.	Prof. Sivapriya Kirubakaran	IIT Gandhinagar
41.	Prof. Vidya Avasare	Ashoka University
42.	Prof. Mano Manoharan	Alnylam Pharma,USA
43.	Dr. Harish Shinde	BASF India, Mumbai
44.	Dr. R. Vallinayagam	BASF India, Mumbai
45.	Dr. Abhijeet Roy	BASF India, Mumbai
46.	Dr. Srinivas Kalinindi	Syngene International, Bengaluru
47.	Dr. Mothis Kumar	Syngene International, Bengaluru
48.	Dr. Sankar Kuppusamy	Syngene International, Bengaluru
49.	Dr. Raghukumar Vellingiri	Syngene International, Bengaluru
50.	Dr. Robindro Singh Sarangthem	PI Industries, Udaipur
51.	Dr. Vishal Mahajan	PI Industries, Udaipur
52.	Dr. Swapnil Yerande	Bayer Corp Science
53.	Dr. Somasekhar	Bayer Corp Science
54.	Dr. N. Selvakumar	DSK Innosciences
55.	Dr. Sampath Kumar	Granules India Pvt. Ltd
56.	Dr. Somath Das	Syngenta Biosciences, Goa
57.	Dr. Sujit Ghorai	Syngenta Biosciences, Goa
58.	Dr. T. Rajamannar	Sun Pharma Advanced Research Company, Vododara
59.	Dr. Ashutosh Prasad Tiwari	Pfizer Chennai

60.	Dr. T. S. Jaganathan	Pfizer Chennai
61.	Dr. Anant R. Ghawalkar	Sai Life Sciences, Hyderabad
62.	Dr. Vikram Sawant	Emcure Pharma, Pune
63.	Prof. Akhila K. Sahoo	NOST Council Member
64.	Dr. Srikrishna Bera	IIT Tirupati
65.	Prof. Vishal Rai	NOST Council
66.	Prof. T. Govindaraju	JNCASR, Bengaluru
67.	Prof. Santanu Mukherjee	NOST Council
68.	Dr. Indranil Chatterjee	IIT Ropar
69.	Prof. S. V. Ramasastry	NOST Council Member
70.	Dr. Pavan Kancharla	IIT Guwahati
71.	Prof. Diwan Rawat	NOST Council Member
72.	Prof. Ravi Prakash Singh	IIT Delhi
73.	Prof. Basker Sundararaju	IIT Kanpur
74.	Dr. Parthasarathi Subramanian	IIT Kanpur
75.	Prof. Dattatraya Dethe	IIT Kanpur
76.	Dr. Benudhar Punji	CSIR-NCL Pune
77.	Dr. Chandrakumar Appayee	IIT Gandhinagar
78.	Prof. D. B. Ramachary	University of Hyderabad
79.	Dr. Punna Nagendar	CSIR-IICT
80.	Dr. Kiran Kumar	IISER, Tirupati
81.	Dr. Rajarshi Samanta	IIT Kharagpur
82.	Dr. Abhishek Dewanji	IIT Mandi
83.	Prof. Prasanta Ghorai	IISER Bhopal
84.	Dr. Modhu Sudan Maji	IIT Kharagpur
85.	Prof. Ramakrishna Peddinti	IIT Roorkee
86.	Dr. Janakiram Vaitla	IIT Delhi
87.	Prof. Suman De Sarkar	IISER Kolkata
88.	Dr. Amit Simlandy	IISER Berhampur
89.	Prof. Ramakrishna G. Bhat	IISER, Pune
90.	Prof. E Balaraman	IISER Tirupati

91.	Prof. Harinath Chakrapani	IISER Pune
92.	Prof. Rajesh Viswanathan	IISER TIrupati
93.	Prof. T. Mohan Das	Central University, Thiruvarur
94.	Dr. K. Parthasarathy	University of Madras
95.	Prof. Srinivasarao Yaragorla	University of Hyderabad
96.	Dr. Srirama Murthy	CSIR-IICT, Hyderabad
97.	Dr. Indubhusan Deb	CSIR-IICB, Kolkata
98.	Dr. Kalyaneswar Mandal	TIFR, Hyderabad
99.	Dr. J. Nithyanandhan	CSIR-NCL Pune
100.	Dr. Alagiri Kaliyamoorthy	IISER Thiruvananthapuram
101.	Prof. Rajib Goswami	IACS, Kolkata
102.	Prof. Alakananda Hajra	Viswa-Bharati University
103.	Prof. Indresh Kumar	BITS, Pilani
104.	Dr. Tabrez Khan	IIT Bhubaneswar
105.	Dr. Sudam Dawande	IIT Madras
106.	Dr. Girish Chandra	Central University, Bihar
107.	Dr. Rajeswara Rao	IIT Dharwad
108.	Prof. Nitin Patil	IISER Bhopal
109.	Dr. Shikha Gandhi	IISER Berhampur
110.	Dr. Mintu Porel	IIT Palakkad
111.	Prof. Vasundhara Singh	Punjab Engineering College
112.	Prof. Sabita Nayak	Ravenshaw University
113.	Prof. D Sharada	Pondicherry University
114.	Prof. M. Vasantha	MG University, Nalgonda
115.	Dr. Suja, T. D.	Calicut University
116.	Dr. Kiranmai Nayani	CSIR-IICT, Hyderabad
117.	Dr. Namrata Rastogi	NOST Council Member
118.	Prof. Iti Gupta	IIT Gandhinagar
119.	Dr. Amrita Hazra	IISER Pune
120.	Dr. P. Rajamalli	IISc, Bangalore
121.	Ms. Archana Shirsat	IIT Bombay

122.	Ms. Adrjia Ghosh	IIT Roorkee
123.	Mr. Tarun Nallamilli	CSIR-IICT, Hyderabad
124.	Mr. Somratan Sau	University of Hyderabad
125.	Mr. Ayan Jati	IISER Kolkata
126.	Mr. Pankaj Roy	IISc Bangalore
127.	Mr. Ajay Kumar Jha	American Chemical Society
128.	Mr. Rajdip Roy	Royal Chemistry India Pvt. Ltd.
129.	Dr. Katie Lim	Executive Editor, OBC, RSC, London
130.	Dr. Rohit Bhatia	Thieme Publishers

NOST COUNCIL

Prof. Krishna P. Kaliappan
Chairperson
IIT Bombay, Mumbai
Email: kpk@chem.iitb.ac.in

Prof. Santanu Mukherjee
Department of Organic Chemistry
IISc, Bangalore
Email: sm@iisc.ac.in

Dr. Srinivas Oruganti
Director, Dr Reddy's Institute of Life Sciences
Hyderabad
Email: soruganti@drils.org

Prof. T. Punniyamurthy
Department of Chemistry
IIT Guwahati
Email: tpunni@iitg.ac.in

Prof. Vishal Rai
IISER Bhopal
Email: vrai@iiserb.ac.in

Dr. Sripada S.V. Rama
IISER Mohali
Email: ramsastry@iisermohali.ac.in

Dr. Namrata Rastogi
Principal Scientist
CSIR-CDRI, Lucknow
Email: namrata.rastogi@cdri.res.in

Prof. D.S. Rawat
Department of Chemistry
University of Delhi
Email: dsrawat@chemistry.du.ac.in

Dr. D. Srinivasa Reddy
Director, CSIR-IICT,
Hyderabad
Email: director@iict.re.in

Prof. Akhila K Sahoo
University of Hyderabad,
Hyderabad
Email: akssc@uohyd.ac.in

Sponsors

AMERICAN CHEMICAL SOCIETY
A C S
ACS
Chemistry for Life®

ROYAL SOCIETY
OF CHEMISTRY

AUT VIAM INVENIAM AUT FACIAM
DR.REDDY'S
INSTITUTE OF LIFE SCIENCES

BASF
We create chemistry

XENON

Emcure®
SUCCESS THROUGH INNOVATION

Spiro Organics Pvt. Ltd.
aiming for faster & greener synthesis