XXII NOST - Organic Chemistry Conference

February 17-20, 2023

Program & Abstracts

Venue: ITC Hotel Rama International, Aurangabad

NOST TRUSTEES

Prof. Ganesh Pandey (Chairman)
Distinguished Professor
Dept. of Chemistry, Institute of Science
BHU, Varanasi - 221 005

Dr. Nitya Anand
B-62 Nirala Nagar
Lucknow
UP-226 007

Prof. S. Chandrasekaran
Department of Organic Chemistry
IISc Bangalore
Bangalore - 560 012

Prof. Sukh Dev
1Ashirwaad, 120, ISKON Mega City
Bhavnagar - 364 001
Gujarat

Prof. S.V. Kessar
Department of Chemistry
Panjab University
Chandigarh - 160 014

Prof. Goverdhan Mehta
Distinguished and Prof. Kallam Anji Reddy
Chair Professor, School of Chemistry
University of Hyderabad, Hyderabad

Dr. K. Nagarajan (Vice-Chairman)
4A, Atishi, Plot No. 8&9
Rose Garder Road, 15th Main
J.P. Nagar, V Phase, Bangalore - 560 078

Prof. Vinod K Singh (Secretary)
Department of Chemistry
IIT Kanpur
Kanpur

Dr. J. S. Yadav
Former Director (CSIR-IICT)
Provost & Director (Research)
Indrashil University

Program Schedule

XXII NOST-Organic Chemistry Conference
Venue: ITC Hotel Rama International, Aurangabad
February 17-20, 2023

February 17, 2023 (Friday)

15.00 to 19.00 h	**Arrival and Check-In**
19.00 to 20.00 h	**DINNER**

20.00 to 20.05 h	**Welcome Remarks by Chair-NOST Council** Krishna P Kaliappan (IIT Bombay)
20.05 to 20.10 h	**NOST-A Brief Overview by President-NOST** Ganesh Pandey (BHU, Varanasi)

Trustees & DST-SERB Session	
Session I **(20.15 to 22.00 h)**	**Chairperson (Vinod K. Singh)**
20.15 to 21.05 h	**Erick M. Carreira** (Chief Editor-JACS, ETH-Zurich) *"Strategies and Tactics in Natural Products as an Engine for Discovery"*
Chairpersons (Santosh J. Gharpure and Manas K. Ghorai)	
21.10 to 22.00 h	**Flash Presentations** Garima Jindal (IISc, Bangalore) Chinmoy Hazara (IIT Delhi) Sandip Murarka (IIT Jodhpur) Indresh Kumar (BITS Pilani) Nilanjana Majumdar (CSIR-CDRI) Jeyakumar Kandaswamy (Pondicherry University) Gopinathan Purushotman (IISER Tirupati) Santanu Panda (IIT Kharagpur)

February 18, 2023 (Saturday)

Astra Zeneca Session	
Session II **(09.00 to 11.00 h)**	**Chairpersons (N G Ramesh and D S Rawat)**
09.00 to 09.30 h	**Yujiro Hayashi** (Tohoku University, Japan) *"Organocatalysis and Pot Economical Synthesis"*
09.30 to 10.00 h	**K. R. Prasad** (IISc Bangalore) *"Scope and Limitations of the Enyne Metathesis approach for the total synthesis of Strychnine"*

10.00 to 10.20 h	**Prathama Mainkar** (CSIR-IICT, Hyderabad) *"HDAC Inhibitor: A case study in drug discovery"*
10.20 to 10.40 h	**Rajib Goswami** (IACS, Kolkata) *"Total Synthesis of Thailandamide Lactone and Thailandamide A"*
10.40 to 11.00 h	**D. Ramachary** (University of Hyderabad) *"Discovery of Parts-per-Million-Level, Catalytic Asymmetric Annulations: Synthesis of Functionally Rich Chiral Methanobenzo[7]annulenes"*
11.00 to 11.30 h	**Photo Session & TEA/COFFEE BREAK**

Cipla Session	
Session III (11.30 to 13.00 h)	**Chairpersons (G. Sekar and Harinath Chakrapani)**
11.30 to 12.00 h	**Dr. Srivari Chandrasekhar** (DST, New Delhi) *"Ideal synthesis to Net Zero Synthesis: why and how?"*
12.00 to 12.30 h	**D. Srinivasa Reddy** (CSIR-IICT, Hyderabad) *"Lead Optimization of Antimalarial Natural Product Cladosporin and New Methods using Silicon Chemistry"*
12.30 to 13.00 h	**M. Manoharan** (Alnylam Pharmaceuticals, Boston, USA) *"Biomimetic Chemistry and RNA Therapeutics"*
13.00 to 14.00 h	**LUNCH BREAK**
14.00 to 19.00 h	**Sight Seeing Trip (Visit to Ellora Caves)**
19.00 to 21.30 h	**BANQUET DINNER**

Day 3 (February 19, 2023)

Panacea Biotech & Jubilant Life Sciences Session	
Session IV (09.00 to 11.00 h)	**Chairpersons (Vishal Rai and Namrata Rastogi)**
09.00 to 09.30 h	**Jerome Lacour** (University of Geneva, Switzerland) *"Chiral Trityls as Versatile Property and Reactivity Platforms – from Oxidative C-C Couplings to Permanent Radicals"*
09.30 to 10.00 h	**J. N. Moorthy** (IISER Trivandrum) *"Photoresponsive MOFs and Catalytic POPs by Bottom-up De Novo Molecular Design"*
10.00 to 10.20 h	**Anindita Das** (IACS, Kolkata) *"Crystallization-Driven Programmable Two-Dimensional (2D) Assemblies from Chromophore-Appended Poly(L-lactide) Homopolymers"*
10.20 to 10.40 h	**S. G. Srivatsan** (IISER, Pune) *"Probing DNA polymerase activity in real time and 3D using functionalized nucleotide analogs"*
10.40 to 11.00 h	**P. C. Ravikumar** (NISER Bhubaneswar)

	"Palladium Catalysed C-C bond Activation of Strained Carbocyclic Ring Systems: A Promising Strategy in Organic Synthesis"
11.00 to 11.30 h	**TEA/COFFEE BREAK**

AVRA-IICT Session	
Session V (11.30 to 13.00 h)	**Chairpersons (T Punniyamurthy and Santanu Mukherjee)**
11.30 to 12.00 h	**S. Thayumanavan** (University of Massachusetts, Amherst USA) *"Bioreactive and Biorthogonal Transformations for Labeling and Conjugating Proteins"*
12.00 to 12.20 h	**Sivapriya K** (IIT Gandhinagar) *"One Scaffold Dual application: Phenothiazineas new scaffoldto treat Glioblastoma"*
12.20 to 12.40 h	**Dattatraya Dethe** (IIT Kanpur) *"Ruthenium Catalyzed Stereo- and Chemoselective Cross-Coupling of Vinyl Ketones: Application to Total Synthesis of Structurally Diverse Natural Products"*
12.40 to 13.00 h	**Anuj Sharma** (IIT Roorkee) *"Pursuit of Electron Donor Acceptor Complexes under Visible light assisted Synthetic Manipulations"*
13.00 to 14.00 h	**LUNCH BREAK**

Sun Pharma & PI Industries Session	
Session VI (14.00 to 16.00 h)	**Chairpersons (Bhanu Manjunath and C V Ramana)**
14.00 to 14.30 h	**Burkhard Koenig** (University of Regensburg, Germany) *"Redox-neutral Photocatalysis – Towards ideal chemical transformations"*
14.30 to 15.00 h	**T. Rajamannar** (Sun Pharmaceuticals Industries Ltd., Vadodara) *"Discovery of A Novel, Long-Acting Dual Agonist for GIPR/GLP-1R, HISHS-2001, Demonstrates Effects on HbA1c and Weight Loss in the db/db Mouse Model of Type 2 Diabetes"*
15.00 to 15.20 h	**Geetharani K** (IISc, Bangalore) *"Boron Chemistry Lights the Way: Synthetic Utility in Carbon-Boron Bond Formation Reaction"*
15.20 to 15.40 h	**Roderick Bates** (NTU, Singapore) *"From structural biology to organic synthesis: A search for new anti-tuberculosis drugs"*
15.40 to 16.00 h	**Nitin Patil** (IISER Bhopal) *"Alkene Functionalizations under Ligand-Enabled Au(I)/Au(III) Redox Catalysis"*

16.00 to 16.30 h	**TEA/COFFEE BREAK**

Syngenta & BASF Session	
Session VII (16.30 to 19.30 h)	**Chairpersons (Srinivas Oruganti and S V Ramasastry)**
16.30 to 17.00 h	**Oliver Reiser** (University of Regensburg, Germany) *"Copper makes the difference:* *Developing Sustainable Photoredox Catalyzed Transformations"*
17.00 to 17.30 h	**D. Maiti** (IIT Bombay) *"En-Light-ening C-H functionalization"*
17.30 to 18.00 h	**Alakesh Bisai** (IISER Kolkata) *"Total Syntheses of Architecturally Intriguing Bioactive Natural Products via the Nature-Inspired Oxidative Strategies"*
18.00 to 18.20 h	**S. Velmathi** (NIT, Trichy) *"Development of Novel Fluorescent probes for Molecular Recognition"*
18.20 to 18.40 h	**Jayanta Haldar** (JNCASR, Bangalore) *"Pursuit of next-generation glycopeptides - Our journey with vancomycin"*
18.40 to 19.00 h	**Indira Sen** (Syngenta Biosciences, Goa) *"The discovery of Isocycloseram: a novel isooxazoline insecticide"*
19.00 to 19.20 h	**P. Anbarasan** (IIT Madras) *"Catalytic Functionalization of Metallocarbenes Derived from Diazo and Non-Diazo Surrogates"*
19.20 to 19.30 h	**Concluding Remarks**
19.30 to 21.30 h	**Dinner**

Day 4 (February 20, 2023)

Breakfast and Departure

ABSTRACTS

Trustees & DST-SERB Session

Chairperson: Vinod K. Singh

VINOD K. SINGH
Rahul & Namita Gautam Chair Professor
Department of Chemistry
IIT Kanpur- 208016
Phone: 0512-259 7291/7577
Mobile: 99811-44455
E-mail: vinodks@iitk.ac.in

Education:

M.Sc.	Banaras Hindu University, Varanasi	1980
Ph.D.	Malti-Chem Research Centre, Nandesari	1986
	(Degree: M.S. University, Supervisor: Dr Sukh Dev)	
Post-doctoral	University of Calgary, Canada	1985-1986
	University of British Columbia, Canada	1986-1987
	Harvard University, U.S.A.	1987-1990
	(Advisor: Professor E. J. Corey, Nobel laureate)	

Research Interests: Synthetic Organic Chemistry: Asymmetric Synthesis

Academic Positions:

Professor (HAG)	IIT Kanpur	18.08.2009 — Present
Professor	IIT Kanpur	13.09.2001 — 17.08.2009
Associate Professor	IIT Kanpur	24.05.1997 — 12.09.2001
Assistant Professor	IIT Kanpur	26.12.1990 — 23.05.1997
Senior Scientist	Neurogen, USA	01.03.1990 - 15.12.1990

Administrative Positions:

Founder Director	IISER Bhopal	12.06.2008 — 04.09.2018
Director *(additional charge)*	MANIT Bhopal	13.05.2017 — 24.07.2017
Mentor Director	IIIT Bhopal	13.05.2017 — 24.07.2017
Mentor Director	IISER Berhampur	12.11.2015 — 09.10.2017
Director *(additional charge)*	SPA Bhopal	28.07.2014 — 26.10.2015
Chairman, BoG	NITTTR Bhopal	01.05.2009 — 24.10.2009
Director *(additional charge)*	SPA Bhopal	06.10.2008 — 29.07.2009

Awards & Honors:

- Rahul and Namita Gautam Chair, IIT Kanpur (01.09.2019 — current)
- TWAS-CASAREP Award for Building Scientific Institutions (2020)
- Samman Patra by UP Government (2018)
- Padma Shri (2014)
- CRSI Silver Medal (2014)
- Distinguished Alumnus Award, BHU (2012)
- Goyal Prize (2011)
- J.C. Bose fellowship (2009-2023)

ERICK M. CARREIRA
Dep. of Chemistry and Applied Biosc.
ETH-Zürich, HCI H335, Zürich, Switzerland
E-mail: carreira@org.chem.ethz.ch

Erick M. Carreira has been full Professor at the Organic Chemistry Laboratory of the ETH Zurich since August 1998.

Professor Carreira was born in Havana, Cuba in 1963. He obtained a B.S. degree in 1984 from the University of Illinois at Urbana-Champaign under the supervision of Scott E. Denmark and a Ph.D. degree in 1990 from Harvard University under the supervision of David A. Evans. After carrying out postdoctoral work with Peter Dervan at the California Institute of Technology through late 1992, he joined the faculty at the same institution as an assistant professor of chemistry and subsequently was promoted to the rank of associate professor of chemistry in the Spring of 1996, and full Professor in Spring 1997. He then moved to ETH Zürich, Switzerland as a full professor in 1998.

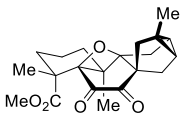
Professor Carreira is a member of both the U.S. National Academy of Sciences and the American Academy of Arts and Sciences. He is the recipient of the Kharasch Lectureship (University of Chicago), Barluenga Lectureship (Royal Spanish Chemical Society), C. S. Marvel Lectureship (University of Illinois), Lieben Award (Austrian Chemical Society), Ziegler Award Lecture (MPI Mulheim), Tischler Award Lecture (Harvard University), Gassman Award Lecture (University of Minnesota), Yamada Koga Prize (Japanese Chemical Society), Len Owen Lecture (Imperial College London), Gilbert Stork Lecture (Columbia University), A. Cruishank Lecturer (Gordon Research Conferences), Julius Stieglitz Memorial Lecture (University of Chicago), American Chemical Society Award in Pure Chemistry, Nobel Laureate Signature Award, Fresenius Award, a David and Lucile Packard Foundation Fellowship in Science, Alfred P. Sloan Fellowship, Camille and Henry Dreyfus Teacher Scholar Award, Merck Young Investigator Award, Eli Lilly Young Investigator Award, Pfizer Research Award, National Science Foundation CAREER Award, Arnold and Mabel Beckman Young Investigator Award, the ACS Award for Creative Work in Synthetic Organic Chemistry, and a Camille and Henry Dreyfus New Faculty Award. He is also the recipient of the Associated Students of the California Institute of Technology Annual Award in Teaching and a Richard M. Badger Award in Teaching. He is co-founder of three start-up companies and has been involved in the development of several chemistry education software tools. In 2019, he was appointed as the editor-in-chief of *Organic Letters*, where he had previously served as an associate editor for 18 years. Starting in 2021, he serves as the editor-in-chief of the *Journal of the American Chemical Society*.

Abstract

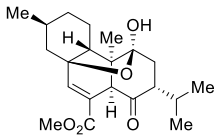
Strategies and Tactics in Natural Products as an Engine for Discovery

Erick M. Carreira
ETH-Zürich, HCI H335, Zürich, Switzerland

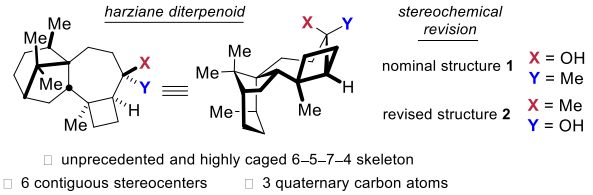
The talk will include discussion and analysis of recent natural product targets that have been synthesized in the group. It will focus on target-oriented synthesis as an engine for the generation of novel methods and approaches to bioactive agents. The methods involve novel, unexpected reactivity and unusual building blocks that are fully integrated to lead to efficient routes.

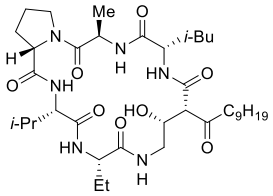


(–)-Mitrephorone A

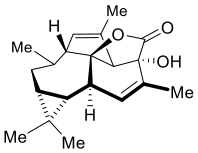


(+)-Sarcophytin
reassigned absolute configuration





Mutanobactin D



Euphorikanin A

Flash Presentations

Chairpersons: Santosh J. Gharpure
&
Manas K. Ghorai

SANTOSH J. GHARPURE
Professor In-Charge SINE &Rasiklal Hemani Fragrance and Flavour Chair Professor
Department of Chemistry
Indian Institute of Technology Bombay
Powai, Mumbai - 400076, INDIA
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Dr. Santosh J. Gharpure graduated with an M.Sc. degree in 1996, from Indian Institute of Technology Bombay, Powai. He obtained Ph.D. from Indian Institute of Science, Bangalore working with Late Prof. A. Srikrishna in 2001. He held a post-doctoral position with Prof. P. Andrew Evans at Indiana University, Bloomington, U.S.A. Subsequently, he joined the Department of Chemistry, IIT Madras, Chennai in the year 2004. In 2012, he moved to the Department of Chemistry, IIT Bombay, Powai, Mumbai as an Associate Professor and was promoted to Professor position in 2016. Currently, he holds the position of 'Rasiklal Hemani Fragrance and Flavour Chair Professor'. He is also Professor In-Charge of SINE, IIT Bombay's technology incubator. His research focuses on organic chemistry pertaining to natural and unnatural product synthesis and developing new synthetic methodologies. He is also working on problems relevant to industries from different domains.

Dr. Gharpure is a recipient of INSA Medal for Young Scientist. He was awarded IIT Madras Young Faculty Recognition Award (YFRA) for his contribution in teaching and research in 2010. He received B. M. Birla science Prize in Chemistry for the year 2011. He was selected as one of the Thieme Chemistry Journal Awardees for the year 2013. IIT Bombay conferred on him the Excellence in Teaching Award in the year 2015 and Departmental award for excellence in teaching in 2019. He was selected as Themis Medicare UICT Diamond Jubilee Distinguished Fellow in Pharmaceutical Science for the year 2015-16 of ICT, Mumbai. He was selected for the award of Chemical Research Society of India (CRSI) Bronze Medal in 2018. He is member of the International Advisory Board of European Journal of Organic Chemistry. He is a Fellow of Royal Society of Chemistry (FRSC). Recently, he was awarded INSA Teachers Award 2021 by Indian National Science Academy, New Delhi.

MANAS K. GHORAI
Professor
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Professor Ghorai was born at Midnapore (West Bengal). He obtained his M.Sc. from Indian Institute of Technology, Kharagpur, India, in 1991. He received his Ph.D. degree in 1998 from the National Chemical Laboratory, Pune under the supervision of Prof. Ganesh Pandey. He worked as a post-doctoral research associate with Prof. Michael Schmittel (1998-2000) at the University of Wuerzburg (Germany), as Alexander Van Humboldt fellow in University of Siegen (2000-2001) and as post doctoral research fellow with Prof. JoAnne Stubbe at the MIT, USA (2001-2002). He then joined the Department of Chemistry at the Indian Institute of Technology, Kanpur in 2002 as an assistant professor. He became an associate professor in 2007. He become full professor in 2012 and HAG Professor in 2019. He was a USV Chair Professor, IIT Kanpur (2015). At present he is a Fellow of National Academy of Sciences (NASI), Alahabad (FNASc), Fellow of West Bengal Academy of Science & Technology (FAST) and Fellow of Academy of Sciences, Bangalore (FASc). His research interests are in the area of synthetic and mechanistic investigation of small ring aza-heterocycle, Memory of Chirality, dianion chemistry and organocatalysis.

GARIMA JINDAL
Department of Organic Chemistry,
Indian Institute of Science,
Bangalore 560012
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Education:

B.Sc. (2007): Hindu College, University of Delhi, India
M.Sc. (2009): University of Delhi, India
Ph.D. (2015): Indian Institute of Technology Bombay, India (*Thesis Advisor*: *Prof. R. B. Sunoj*)

Professional Experience:

March 2019 to present: Assistant Professor, Department of Organic Chemistry, Indian Institute of Science Bangalore, India
June 2015- June 2018: Postdoctoral research associate at the University of Southern California, USA (*Prof. Arieh Warshel*)

Research Areas:

1) Understanding promiscuity of metalloenzymes and terpene synthases using QM cluster and QM/MM methods to open up new avenues in enzyme design. Role of metals and mutations in engineered myoglobins.
2) Machine learning methods to understand directed evolution and the thread that links it with conformational dynamics and enzyme promiscuity.
3) Role of solvents in controlling the reaction outcome using *ab initio* dynamics.

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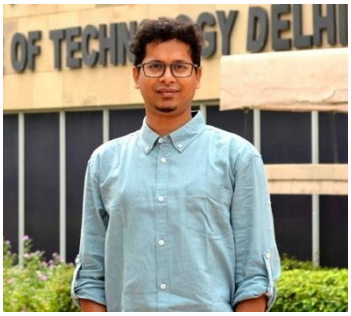

Education:

10/2010 - 09/2013 Doctoral Degree, Westfälische Wilhelms-Universität Münster [10/2010–08/2011] and Technische Universität Berlin [9/2011–9/2013], Germany, **Major:** Organic Chemistry
Advisor: Prof. Martin Oestreich

09/2008 - 08/2010 Post-Graduate Degree, Indian Institute of Technology Bombay; **Major:** Chemistry (one-year M.Sc. project in organic synthesis)
Advisor: Prof. I. N. N. Namboothiri

07/2004 - 07/2007 Under-Graduate Degree, Ramakrishna Mission Residential College, Narendrapur, University of Calcutta; **Major:** Chemistry

Professional appointments & experiences:

03/2019 - Present Assistant professor, Department of Chemistry, IIT Delhi, India

08/2018 - 03/2019 Postdoctoral Associate, KAUST, Jeddah, Kingdom of Saudi Arabia
Advisor: Prof. Magnus Rueping

12/2014 - 07/2018 Postdoctoral Associate, KAIST, Daejeon, South Korea
Advisor: Prof. Sukbok Chang

10/2013 - 09/2014 Postdoctoral Associate, University of Strasbourg, Strasbourg, France.
Advisor: Prof. Françoise Colobert

05/2009 - 07/2009 Summer Project, Saha Institute of Nuclear Physics (SINP), Kolkata, India
Advisor: Prof. Soumen Basak

SANDIP MURARKA
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Sandip Murarka did his B.Sc. in Chemistry (Hons.) from Midnapore College, Vidyasagar University (2005), and M.Sc. from IIT Bombay (2007). Subsequent to a M.S. from Rutgers University, U.S.A (2009); he moved to Germany to pursue his PhD from WWU Münster under the supervision of Prof. Armido Studer. After completion of his Ph.D. (2013), he worked as a Max-Planck postdoctoral research fellow in the laboratory of Prof. Herbert Waldmann at Max Planck Institute of Molecular Physiology, Dortmund (2013-2016). Following a year long stay (2016-2017) as a Team Leader in a reputed pharmaceutical company, Syngene International Limited, he decided to move back to academia. In May 2017, he joined Indian Institute of Technology Jodhpur, India as an Assistant Professor and got promoted to the post of Associate Professor in June 2022. His current research activities include study of novel activation modes and development of chemoselective and sustainable transformations towards the synthesis of biologically relevant and interesting molecular architectures.

Awards:

1. 'Thieme Chemistry Journal Award' by the editorial boards of the journals Synthesis, Synlett, and Synfact (2022).
2. Early Career Advisory Board Member of Wiley-VCH Journal 'ChemistrySelect' (2022).
3. Fellow of Indian Chemical Society (2020).
4. Early Career Research Award (ECRA) from Science and Engineering Research Board (SERB) (2018).
5. INSPIRE Faculty Award from the Department of Science & Technology (DST), India (2016).

INDRESH KUMAR
Associate Professor
Birla Institute of Technology & Science
Pilani (BITS Pilani)
Email: indresh.chemistry@gmail.com

Dr. Indresh Kumar is currently an Associate Professor (Chemistry) at the Birla Institute of Technology & Science, Pilani (BITS Pilani). After completing his Ph.D. (Chemistry) from 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 Lecturer at SMVDU, Katra, (J&K) before joining BITS Pilani in 2012.

Dr. Kumar is the recipient of Award of “ISCB Young Scientist award in Chemical Sciences-2016” from the Indian Society of Chemists and Biologists, Lucknow, and “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, and the total synthesis of biologically active compounds.

NILANJANA MAJUMDAR
Senior Scientist
CSIR-Central Drug Research Institute
Sector 10, Jankipuram Extension,
SitapurRoad,
Lucknow-226031
Email: nilanjana.majumdar@cdri.res.in

Dr. Nilanjana Majumdar started her chemistry journey from *Visva-Bharati University in West Bengal, India*. She completed her undergraduate education there with first class first in B.Sc. (Chemistry Hons.). In 2003, she went to *IIT Kharagpur* to pursue Masters. For Ph.D., she moved to *United States* in 2006 and worked under the supervision of *Professor William D. Wulff in Michigan State University*. After graduation in 2012, she moved to *Tokyo, Japan* for first postdoctoral experience in *Professor Masakatsu Shibasaki*'s group with *JSPS fellowship*. After three years in Japan, she worked in *Professor Benjamin List*'s group for one year in *Max-Planck Institut für Kohlenforschung, Germany*. In April, 2018, she joined CSIR-Central Drug Research Institute (CSIR-CDRI), Lucknow as Senior Scientist in Medicinal & Process Chemistry Devision.

Research interests:

1. Development of new synthetic strategies and drug discovery
2.Asymmetric catalysis & synthesis
3. Transition metal catalysis
4. Organocatalysis
5. Heterocyclic chemistry

JEYAKUMAR KANDASWAMY
Associate Professor,
Department of Chemistry
Pondicherry University, Kalapet,
Pondicherry, India-605014
Email: jeyakumar.chy@pondiuni.ac.in

ACADEMIC POSITIONS:

Time Period	Position	Institute
Aug 2022 - On going	Associate Professor	Department of chemistry, Pondicherry University
Aug 2019 - Aug 2022	Associate Professor	Department of Chemistry, Indian Institute of Technology (B.H.U) – Varanasi
Jun 2014 - Aug 2019	Assistant Professor	Department of Chemistry, Indian Institute of Technology (B.H.U)– Varanasi

POST-DOCTORAL POSITIONS:

Time Period	Position	Institute	Topic of research
Feb. 2012 – Nov. 2013	Postdoctoral Fellow with Prof. Peter. H. Seeberger	Max Planck Institute ofColloids and Interfaces (MPIKG), Berlin, Germany	Automated synthesis of tuberculosis cell wall oligosaccharides
Oct. 2008 – Dec. 2011	Postdoctoral Fellow with Prof.Timor Baasov	Technion-Israel Instituteof Technology, Haifa, Israel.	Redesign of aminoglycosides (carbohydrates) for human geneticdisorders

Ph. D:

Time Period	Institute	Thesis Title
Aug. 2004– Jul. 2008	Indian Institute of Technology, Madras(IITM), Chennai, India; Supervisor: Dr. Dillip Kumar Chand	Molybdenum(VI) catalysts in organic transformations

AWARDS AND HONOURS:

- **Euroglycoscience Award** from European young investigator workshop-**France**. **2011**
- **Schulich Postdoctoral Fellowship** (Technion, Israel): **Oct. 2008 –Sep-2011**

GOPINATHAN PURUSHOTHAMAN
Department of Chemistry, IISER-Tirupati,
Tirupati - 517507, India.
Email: gopi@iisertirupati.ac.in;
pgopinath82@gmail.com

Academic Career:

Feb 2017 – till date: Assistant Professor, Dept. of Chemistry, IISER-Tirupati, Tirupati.

Research Experience:

Dec 2013 – Feb 2017: **Postdoctoral fellow, Prof. Ronald Breslow group,** Department of Chemistry,Columbia University, New York, U.S.A

April 2011 – Nov 2013: **JSPS Postdoctoral Fellow. Prof. Masakatsu Shibasaki group,** Laboratory ofSynthetic Organic Chemistry, Institute of Microbial Chemistry, Tokyo, Japan

Education:

Aug 2005 – Feb 2011: **Ph.D in Organic Chemistry. Supervisor: Prof. S. Chandrasekaran,** Thesis title "**Synthesis of Novel Chalcogenides using Acyloxyphosphonium Intermediates and Doubly Activated Cyclopropanes**" Indian Institute of Science, Bangalore, India.

July 2003 – May 2005: **Master of Science in Organic Chemistry,** First class with distinction **(80%),** University of Madras, Chennai, India. Project title "Regioselective Synthesis of Spiroxindolo and Spiroxozolo Pyrrolidines and Pyrrolizidines"(**Supervisor: R. Raghunathan)**

July 2000 - May 2003: **Bachelor of Science in Chemistry**, First class with distinction **(83.5%),** Vivekananda College (University of Madras), Chennai, India.

Academic Achievements and Awards:

- **ECRA (Early Career Research Award),** 2019
- **Ramanujan** Fellowship, 2017
- **JSPS** (Japan Society for the Promotion of Science) Postdoctoral fellowship.
- Prof. S. Swaminathan Endowment Lectureship and **Prize** for **outstanding student** in M.Sc. Organic Chemistry at University of Madras.

SANTANU PANDA
Assistant Professor
Department of Chemistry
Indian Institute of Technology Kharagpur
Email: spanda@chem.iitkgp.ac.in

Dr. Santanu Panda obtained his PhD in 2013 in organocatalysis and total synthesis of natural products under Prof. Antony Pearson, Case Western Reserve University, Cleveland, USA. After finishing his PhD, he moved to Dallas and joined Prof. Joseph Ready's group as a postdoc. During his postdoc, he was exposed to transition metal-catalysed cross-coupling and organoboron chemistry. On July 2018, he joined IIT Kharagpur as an assistant professor. His group is very much active in organoboron chemistry, total synthesis of natural products and organophotoredox chemistry.

Awards / Honors / Membership:

- 2022 CRS (Chirantan Rasayan Sanstha) Bronze Medal
- 2018 Ramanujan Fellowship from SERB
- Best Poster Award at UTSW Biochemistry Retreat at Dallas Botanical Garden, Dallas On 2017.
- Invited seminar to the annual UTSW Biochemistry department seminar series at UT Southwestern Medical Center, Dallas.
- Graduate outstanding teaching assistant award 2013, Department of Chemistry, Case Western Reserve University, USA.

Astra Zeneca Session

Chairpersons: N. G. Ramesh & D. S. Rawat

N. G. RAMESH
Professor
Department of Chemistry
Indian Institute of Technology Delhi
India
Email: ramesh@chemistry.iitd.ac.in

Education:

Ph.D. (Prof. K. K. Balasubramanian), IIT Madras

Postdoctoral fellow:

1. Prof. Alfred Hassner at Bar-Ilan University, Israel.

2. Prof. Binne Zwanenburg at the University of Nijmegen, The Netherlands.

3. JSPS postdoctoral fellow with Prof. Yasuyuki Kita at Osaka University, Japan. Indian Institute of Technology Delhi, 2000-present.

Research Interests:

Our group's research activities mainly focus on the synthesis of biologically active natural products and their analogues from readily available and cheap carbohydrates as a "chiral pool" through some novel and interesting chemical transformations. Our main aim is to develop a "Diversity Oriented Approach" towards the synthesis of a library of skeletally distinct small and novel molecules with potential biological applications. Glycals (carbohydrate derived enol-ethers), which are perhaps the most versatile monosaccharides, are being extensively exploited by us, as convenient starting materials, to realize our research focus. Illustrative examples of natural products and their mimics that were synthesized recently and are being pursued currently in our lab include, 1-deoxy-L-gulonojirimycin, DMDP analogues, amino-DMDP analogues, chiral 2,6-diazabicylo[3.2.1]octan-4,8-diol (a chiral conformationally restricted diamine), (–)-pochonicine stereoisomers, steviamine stereoisomers, conduramines, (+)-anisomycin, bulgecinine, kirkamide etc. Apart from synthesis, we also carry out the inhibition studies of new compounds that were/are being synthesized in our lab. Some of these compounds display inhibition against glycosidases, SOD1 fibril formation etc.

D. S. RAWAT
(Sr. Professor)
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University of Delhi, India
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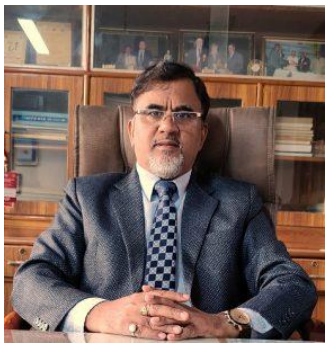

Professor Diwan S Rawat joined the Department as a Reader in July 2003, and was promoted to Professor in March 2010. He obtained his master's degree from Kumaun University, Nainital in 1993 and was honoured with the merit certificate for securing first position in the University. He did his Ph.D. in Medicinal Chemistry from Central Drug Research Institute, Lucknow. He worked two years in a Pharmaceutical Industry and did postdoctoral work at Indiana University and Purdue University, USA. He was an Assistant Professor of Medicinal Chemistry at National Institute of Pharmaceutical Education and Research (NIPER), Mohali, before joining University of Delhi in 2003. Prof. Rawat has published over 158 research papers, authored a book, three book chapters, and nine patents to his credit. His work has been cited over 5678 times with h–index of 42 and i-index of 122. His research interests lies in the areas of development of small organic molecules as anticancer, antimalarial, antimicrobial and anti-Parkinson agents and nano-catalysis. One of his molecule has been licenced to Boston based pharmaceutical industry for the development as a drug for the treatment of Parkinson`s disease.

Prof. Rawat was a Sectional President of Indian Science Congress (2019-2020) and is a recipient of CRSI young scientist award (2007); ISCB young scientist award (2010); Prof. D. P. Chakraborty 60th Birth Anniversary Commemoration Award (2007); VC`s Pratik Chinha Samman, Kumaun University Nainital (2011); Gold Badge and Diploma, International Scientific Partnership Foundation, Russia (2015); Professor RC Shah Memorial Lecture Award, Indian Science Congress (2015); Professor SP Hiremath Memorial Award, Indian Council of Chemist (2016); Special Appreciation Award for Exemplary Services, University of Delhi (2021); Platinum Jubilee Lecture, Indian Science Congress (2021). Prof Rawat is a Visiting Professor, Japan Advanced Institute of Science and Technology (JAIST), Japan. He is elected fellow of National Academy of Sciences, Fellow of Royal Society of Chemistry (FRSC) and CChem (London). Prof. Rawat has supervised twenty six PhD students.

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Aoba-ku, Sendai 980-8578, Japan
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Education:

1984 B.S. The University of Tokyo, Graduate School of Science
Research adviser: Prof. Teruaki Mukaiyama
1992 Ph.D. The University of Tokyo, Graduate School of Science
Research adviser: Prof. Koichi Narasaka
1994-1996 Postdoc at Harvard University, Research adviser: Prof. E. J. Corey

Academic Background:

1987-1998 Assistant Professor
(The University of Tokyo, Graduate School of Science)
1998-2006 Associate Professor
(Tokyo University of Science, Faculty of Engineering)
2006-2012 Professor (Tokyo University of Science, Faculty of Engineering)
2012-present Professor (Tohoku University, Graduate School of Science)

Award:

1998 Incentive Award in Synthetic Organic Chemistry, Japan 1998 2008
SSOCJ Daiichi-Sankyo Award for Medicinal Organic Chemistry
2010 The Chemical Society of Japan Award for Creative Work for 2010
2011 JSPS 2011 Award for Excellence
2011 NOVARTIS Chemistry Lectureship Award
2011 Oppolzer Lecture (University of Geneva)
2012 Inoue Prize for Science
2021 The 21th Green and Sustainable Chemistry Award, Award by the Ministry of Education, Culture, Sports, Science and Technology
2022 The Commendation for Science and Technology by the Minister of Education, Culture, Sports, Science and Technology, Awards for Science and Technology, Research Category

Research Interest:

Organic synthesis. Development of new synthetic methods using organocatalysis. Synthesis of biologically active natural products.

Abstract

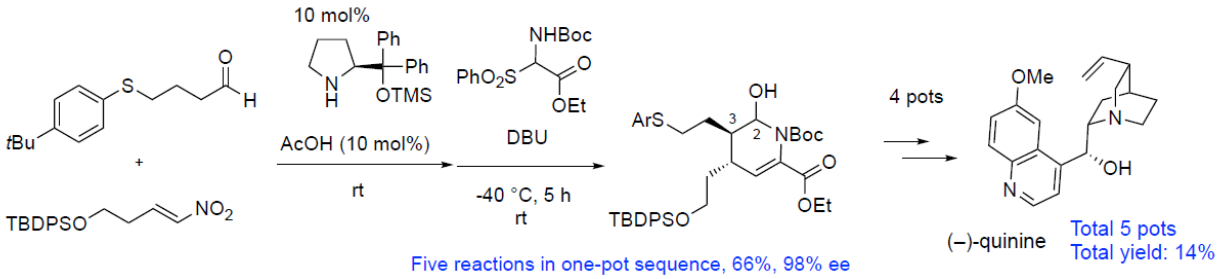
Organocatalyst and Pot Economical Synthesis

Yujiro Hayashi
Department of Chemistry, Graduate School of Science,
Tohoku University, Sendai, Japan

Organocatalyst is an environmentally benign catalyst. Our group[1] and Jørgensen's group[2] independently discovered that diphenylprolinol silyl ether is an effective organocatalyst in the reaction involving enamine and iminium ion as reactive intermediates.

On the other hand, one-pot operations are an effective method for both carrying out several transformations and forming several bonds in a single-pot, while at the same time cutting out several purifications, minimizing chemical waste generation, and saving time. Thus, a one-pot reaction can be not only efficient, but also green and environmentally friendly, and "poteconomy"
should be considered in planning a synthesis.[3]

We have been investigating the application of this organocatalyst to the one-pot synthesis of biologically active molecules. Quinine is one of the cinchona alkaloids. It is an important antimalarial medication, and its derivatives are used not only as ligands of asymmetric metal catalysts, but also as effective asymmetric organocatalysts. Thus, it is important to develop an efficient method for the synthesis of quinine. Using diphenylprolinol silyl ether-mediated asymmetric Michael reaction, we can construct a chiral piperidine skeleton with excellent diastereo- and enantioselectivities by three component coupling reaction in a single reaction vessel. By employing one-pot reactions as much as possible, we have accomplished a five pot synthesis of (–)-quinine.[4]



Scheme: Five pot synthesis of (–)-quinine

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1. Hayashi, Y.; Gotoh, H.; Hayashi, T.; Shoji, M. *Angew. Chem. Int. Ed.* **2005**, *44*, 4212.
2. Marigo, M.; Wabnitz, T. C.; Fielenbach, D.; Jørgensen, K. A. *Angew. Chem. Int. Ed.* **2005**, *44*,
794.
3. Hayashi, Y. *Chem. Sci.* **2016**, *7*, 866. *J. Org. Chem.* **2021**, *86*, 1. *Acc. Chem. Res*. **2021**, *54*, 1385.
4. Terunuma, T.; Hayashi, Y. *Nat. Commun.* **2022**, *13*, 7503.

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Prasad (b.1969) obtained his B. Sc (Chemistry) from Andhra University, Visakhapatnam and MSc from Sri Krishnadevaraya University, Anantapur Andhra Pradesh. He obtained PhD from University of Pune in 1997 in asymmetric catalysis working at the National Chemical Laboratory (NCL), Pune under the guidance of Dr. N. N. Joshi. He held post-doctoral positions as the Alexander von Humboldt Foundation fellow (1998-2000) at the University of Muenster, Germany with Prof. Dr. Dieter Hoppe and another post-doctoral stay with Prof. Franklin A. Davis at Temple University, Philadelphia, PA, USA. After a brief stint as scientist in Medicinal Chemistry at Praecis Pharmaceuticals (presently GlaxoSmithKline) in Waltham, MA, USA, Prasad joined Department of Organic Chemistry, Indian Institute of Science in November 2003 where currently he is currently Professor.

Prasad's research interests are concerned with the development of synthetic strategies for the total synthesis of natural products of therapeutic significance and their evaluation as potent therapeutics.

Prasad is recipient of the Swarnajayanthi fellowship of the Department of Science and Technology, National Academy of Sciences-SCOPUS young scientist award administered by Elsevier, Prof. N. S. Narasimhan Endowment lecture award of the University of Pune, Rajib Goyal Prize and the Shanti Swarup Bhatnagar Prize in chemical Sciences. Prof. Prasad is an elected fellow of the Indian Academy of Sciences, Bangalore and The National Academy of Sciences, India.

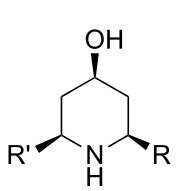
Prof. Prasad is an Associate Editor of Organic Letters a premier journal in organic chemistry published by the American Chemical Society.

Abstract

Scope and Limitations of the Enyne Metathesis approach for the total synthesis of Strychnine

Kavirayani R. Prasad
Department of Organic Chemistry
Indian Institute of Science, Bangalore

Our research group has been involved in the total synthesis of polyketide natural products using chiral pool tartaric acid and chiral furyl carbinols as the four carbon four hydroxy synthon. During the course of our synthesis of the natural product schulziene B, we had an unexpected entry to the realm of sulfinimine chemistry. This led to us to develop procedures for the direct addition of ketones, substituted methyl enones and other nucleophiles to non-racemic sulfinimines. In this talk, our efforts in application of the above methods in the total synthesis of alkaloids including the approach for the total synthesis of strychnine will be discussed.[1-4]



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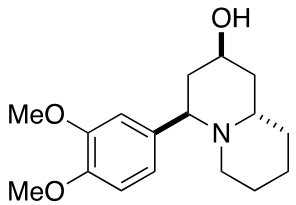
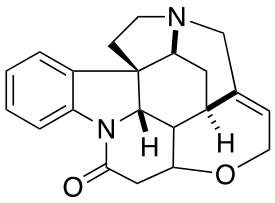


Lasubine



Strychnine

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1. Reddy, A. A.; Prasad, K. R. *J. Org. Chem*. **2018**, *83*, 10776-10785.
2. Uphade, M. B.; Reddy, A. A.; Khandare, S. P.; Prasad, K. R. *Org*. *Lett*. **2019**, *21*, 9109-9113.
2. Khandare, S. P.; Reddy, P. O.; Prasad, K. R. *Org. Lett.* **2020,** *22*, 7273-7277.
3. Khandare, S. P.; Prasad, K. R. *J. Org. Chem.* **2021**, *86*, 12285-12291.

PRATHAMA MAINKAR
Senior Principal Scientist
CSIR-Indian Institute of Chemical Technology
Email: prathama@iict.res.in

Dr Prathama Mainkar has studied in Osmania University for M. Sc., Organic Chemistry and Ph. D. was from CSIR-Indian Institute of Chemical Technology. She has:

- Published over 85 peer reviewed papers in the areas of organic synthesis and medicinal chemistry, 1 book chapter and filed 32 patents.
- Has experience in industry as well as academics.
- Developed a molecule up to Phase IIa clinical trials bought by biotech company.
- Worked on identifying new scaffolds for treatment of tuberculosis, new molecules with antiviral potential and identified new scaffolds for drug resistant bacterial infections.
- At present research is focused on developing HDAC inhibitor for the treatment of idiopathic pulmonary fibrosis for IND filing.
- Has developed scalable processes for APIs in laboratory, carried out optimization studies in pilot plant and demonstrated the processes in manufacturing plants.
- Worked on kinase inhibitor for treatment of squamous small cell lung cancer.
- Has experience in synthesis of oligosaccharides and oligopeptides

Research Interests:

- Medicinal Chemistry and Drug discovery
- Synthetic Organic Chemistry and process development for API synthesis

Awards and Honours:

- Fellow, National Academy of Sciences, India
- CRSI Bronze Medal 2023
- National Tech Excellence Award for Women by TDB, GoI, 2022
- CSIR Technology Award 2021 (for Covaxin® adjuvant)
- Best Woman Scientist Award 2021 by Genesin of Education Institute
- CSIR Technology Award 2020 (for process of Favipiravir)
- CSIR-IICT Best Woman Scientist of the year 2017
- OPPI Woman Scientist Award 2016
- Fellow of Telangana Academy of Sciences, Telangana
- Research Council member, CSIR-NCL
- Advisor, Heavy Water Board, DAE

Positions Held:

- Senior Principal Scientist, CSIR-Indian Institute of Chemical Technology
- Head Chemistry, Evolva Biotech
- Assoc. Director MedChem, Sai Life

Abstract

HDAC Inhibitor: A case study in drug discovery

Prathama S. Mainkar
Senior Principal Scientist
CSIR-Indian Institute of Chemical Technology

Drug discovery involves 10-122 years of work to bring a molecule to market. Our group has worked on synthesizing three scaffolds which were *pan*-HDAC inhibitors and through principles of drug discovery, identified a molecule with selective HDAC isoform inhibition. The molecule has shown good activity against idiopathic pulmonary fibrosis. The efforts to identify a molecule with desired properties and progressing it for IND filing will be presented.

Ref: WO201930334; Indian Patent 202011038497

RAJIB GOSWAMI
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Indian Association for the Cultivation of Science
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Kolkata 700032 (WB), INDIA
Email: ocrkg@iacs.res.in

Dr. Goswami obtained his B.Sc in 1999 (Krishnath College, Berhampore) and M.Sc in 2001 (Raja Bazar Science College) under The University of Calcutta, West Bengal. He completed his Ph.D on Chemical Synthesis of natural products in 2007 at Indian Institute of Chemical Technology, Hyderabad, under the supervision of Prof. Tushar Kanti Chakraborty (Degree was awarded by University of Kalyani in 2008). Dr. Goswami was then moved to The Scripps Research Institute, California, USA for his postdoctoral work (2007-2011) under the tutelage of Prof. Subhash C. Sinha where he worked on chemical synthesis of drug/drug like molecules and their delivery using monoclonal antibody. After completion of postdoctoral study, Dr. Goswami joined as Assistant Professor at the Department of Organic Chemistry, Indian Association for the Cultivation of Science (IACS) on 2011. He was promoted to Associated Professor on 2016 at the School of Chemical Sciences, IACS and subsequently to Professor at the same School on 2020.

Dr. Goswami is interested in the area of enantioselective total synthesis of novel natural products of therapeutic significance. His laboratory successfully solved the structural riddles of many natural products and developed synthetic routes of more than 35 marine and terrestrial natural products till the date. Moreover, Dr. Goswami's laboratory is actively involved in synthesis of new simplified variants of bioactive natural products to find their biomedical applications.

Dr. Goswami is the recipient of SERB-STAR award (2021) and CRSI-Bronze Medal (2023).

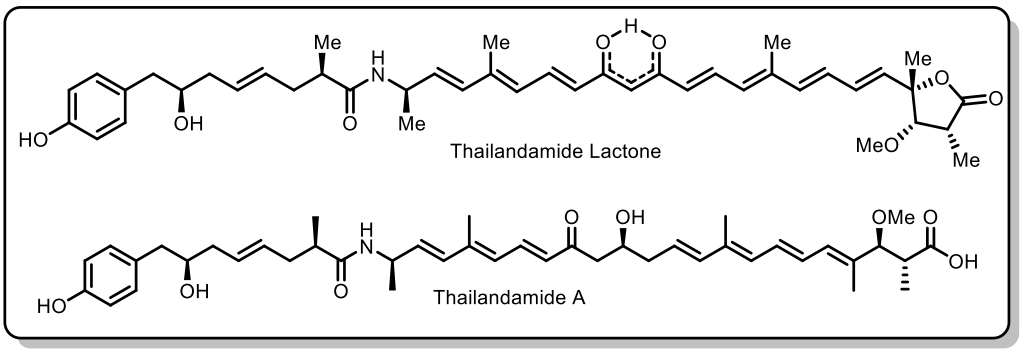
Abstract

Total Synthesis of Thailandamide Lactone and Thailandamide A

Rajib Kumar Goswami
School of Chemical Sciences
Indian Association for the Cultivation of Science, Kolkata

Natural product served as important sources for powerful therapeutics against pathogenic microbes by virtue of their lethal and selective action. Development of synthetic routes to access these useful natural products are always important to understand them in details. Hertweck and co-workers in 2008 and 2010 have isolated novel polyketide natural product thailandamide A[1] and its genetically engineered analogue thailandamde lactone[2]. Broad biological screening of thailandamide A revealed its selective and potential inhibitory activity against different pathogenic Gram-positive and Gram-negative bacteria with specific mode of action. However, the antibacterial activity of thailandamide lactone remained undisclosed. Highly challenging architectural features, natural scarcity, lack of synthetic route together with our continual interest in natural products chemistry encouraged us to envisage the total synthesis of thailandamide lactone and thailandamide A. In this presentation, the state of art associated with the first asymmetric total synthesis of cryptic natural product thailandamide lactone[3] and natural product thailandamide A will be discussed.

Figure: Chemical Structures of Thailandamide Lactone and Thailandamide A



References:

(1) T. Nguyen, K. Ishida, H. Jenke-Kodama, E. Dittmann, C. Gurgui, T. Hochmuth, S. Taudien, M. Platzer, C. Hertweck and J. Piel, *Nat. Biotechnol*., **2008**, *26*, 225-233.
(2) K. Ishida, T. Lincke, S. Behnken and C. Hertweck*, *J. Am. Chem. Soc*., **2010**, *132*, 13966–13968.
(3) H. Sharma, J. Mondal, A. Ghosh, R. R. Pal and R. K. Goswami*. *Chem. Sci.,* **2022**, *13*, 13403-13408.

DHEVALAPALLY B. RAMACHARY
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Ramachary graduated with M.Sc. degree in School of Chemistry from University of Hyderabad and obtained Ph.D. in synthetic organic chemistry from Indian Institute of Science, Bangalore in 2001. He subsequently held postdoctoral position at the Scripps Research Institute for Catalysis, prior to joining University of Hyderabad in January 2005, where presently he is full professor of organic chemistry.

He is a recipient of many awards including Fellow of the National Academy of Sciences, Allahabad-2021, Fellow of the Royal Society of Chemistry, London-2020 and Fellow of Indian Academy of Sciences, Bangalore-2018.

He has guided 20-PhD students, 13 PDFs and out of them, 5-PhD's got Eli Lilly & Company Asia Outstanding Thesis Awards 2011, 2012, 2013, 2014 and 2021.

He is an Editorial Advisory Board Member, Organic & Biomolecular Chemistry, RSC Journal 2013-present, Editorial Advisory Board Member, European Journal of Organic Chemistry, Wiley Journal 2017-present, and Editorial Advisory Board Member, Tetrahedron Chem, Elsevier Journal 2021-present.

Prof. Ramachary serving as a reviewer for many national and international reputed journals and member in many committees of national funding body, DST, SERB.

Prof. Ramachary published more than 111 research papers in both national and international reputed journals, two books on emerging organocatalysis area and few chemical reactions are named after him.

Prof. Ramachary delivered more than 130 lectures in both national and international conferences.

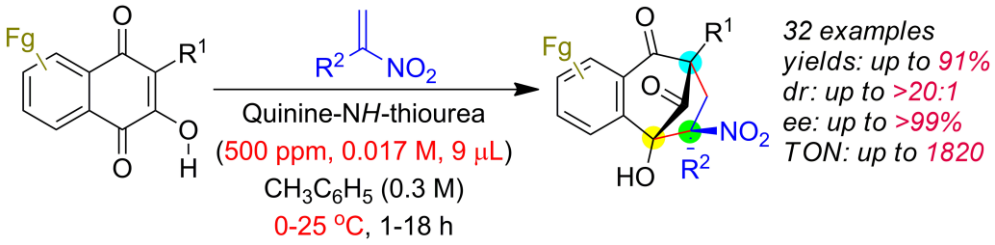
Abstract

Discovery of Parts-per-Million-Level, Catalytic Asymmetric Annulations: Synthesis of Functionally Rich Chiral Methanobenzo[7]annulenes

Dhevalapally B. Ramachary
Catalysis Laboratory, School of Chemistry
University of Hyderabad, Hyderabad-500046 (Telangana), INDIA

Methanobenzo[7]annulenes have become important molecules in the medicinal chemistry. In this context, functionally rich chiral methanobenzo[7]annulenes have received considerable attention from the synthetic and medicinal chemists.

Recently we have discovered an organocatalytic, ppm-level, asymmetric enol–olefin [3+2]-annulation reaction of a variety of enolizable 3-alkyl-lawsones with nitroethylenes under the ambient conditions.[1] The ppm-level, catalytic asymmetric [3+2]-annulation reaction accommodates amazing features, such as low catalyst loading, high rate and selectivity, mild reaction conditions, easily available substrates with simple operation, and excellent yields, *ee*, *dr* with a broad spectrum of substrates. It accolades the previously known annulation reactions. More details on this new catalytic annulation reaction will be discussed.

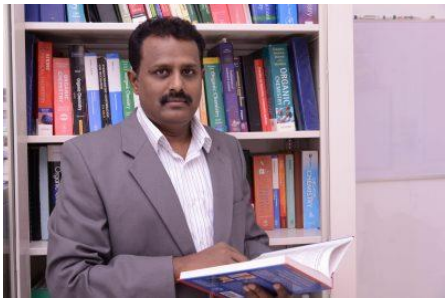


(1) (a) D. B. Ramachary, M. A. Pasha, G. Thirupathi, *Angew. Chem. Int. Ed.*, **2017**, *56*, 12930-12934; (b) S. Peraka, M. A. Pasha, G. Thirupathi, D. B. Ramachary, *Chem. Eur. J.*, **2019**, *25*, 14036-14041; (c) M. A. Pasha, S. Peraka, D. B. Ramachary, *Chem. Eur. J.*, **2021**, *27*, 10563-10568; (d) G. Thirupathi, E. Ashok, A. S. Kumar, D. B. Ramachary, *Chem. Eur. J.*, **2021**, *27*, 18033-18038.

Cipla Session

Chairpersons: G. Sekar & Harinath Chakrapani

G. SEKAR
Professor
Department of Chemistry
IIT Madras
Chennai, Tamilnadu- 600036
Email: gsekar@iitm.ac.in



Prof. Sekar obtained his Ph.D. from IIT Kanpur in 1999 under the guidance of Padma Shri, Prof. Vinod K. Singh. He was a JSPS postdoctoral fellow at TUT, Japan, and an AvH postdoctoral fellow at Goettingen University, Germany. He also carried out postdoctoral research at Caltech, USA. Prof. Sekar's research on organic synthesis focuses on developing new synthetic methodologies that employ environmentally benign homogeneous catalysts, metal nanocatalysts, and halogen bonding catalysis. Prof. Sekar has more than 130 publications, graduated 25 Ph.D. students and presently guiding 12 Ph.D. students. He is the recipient of the Institute Research and Development Award (Mid-Career)-2017, JSPS, AvH postdoctoral fellowships, and CRSI bronze medal (2015). He is the Fellow National Academy of Sciences (FNASc, 2019), Fellow of Royal Society of Chemistry (FRSC), and Fellow of the Academy of Sciences, Chennai (FASCh). He is also a present council member of the National Organic Symposium Trust (NOST), Chemical Research Society of India (Joint Secretary, CRSI), and Academy of Sciences, Chennai.

Education:

- 1999 - Ph. D from IIT Kanpur
- 1995 - M. Sc from University of Madras
- 1993 - B. Sc from University of Madras

Representative Publications:

Copper-catalyzed domino synthesis of multisubstituted benzo[b]thiophene through radical cyclization using xanthate as a sulfur surrogate (N. Sundaravelu, Tushar Singha, Anuradha Nandy, and **Sekar**, *Chem. Commun.*, **2021**, *57*, 4512).

Selective oxidation of alkylarenes to aromatic acids/ketone in water by using reusable binaphthyl stabilized Pt nanoparticles (Pt-BNP) as a catalyst, Saha, R.; Sekar, G., *Applied Catalysis B: Environmental*, **2019**, 250, 325. (highlighted in "The Hindu" national English newspaper (31st March 2019)

HARINATH CHAKRAPANI
Professor
Department of Chemistry
IISER Pune
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Harinath Chakrapani completed his undergraduate and post-graduate studies in Chemistry from Loyola College (1994-97) and Indian Institute of Technology Madras (1997-99), respectively. In 1999, he moved to Duke University, USA to pursue his doctoral studies, which he completed in 2005. His post-doctoral research work was carried out at Wake Forest University and the National Cancer Institute. He joined IISER Pune in July 2009 and is currently Professor.

Prof. Harinath Chakrapani's group designs, synthesizes and evaluates organic compounds that can produce redox-active species derived from sulfur, nitrogen and oxygen in a spatiotemporally controlled manner as tools for biochemical and cell biological studies. These biological reactive species are produced during normal metabolism but elevated levels can cause irreparable damage to cells. The tools developed in their lab provide insights into disease mechanisms as well as new leads in developing therapeutics. The focus is on infectious diseases, with a special focus on antimicrobial resistance as well as neurodegenerative disorders, which are frequently associated with dysfunction in redox homeostasis.

Selected Publications:

Bora, P.; Manna, S.; Nair, M.; Satha, R.M.S.; Singh, S.; Adury, V.S.S.; Gupta, K.; Mukherjee, A.; Saini, D. K.; Kamat, S.S.; Hazra, A. B.; Chakrapani, H. *Chemical Science*, (2021) in press.

Khandelwal, N.; Shaikh, M.; Mhetre, A.; Balaji, K. N.; Chakrapani, H.; Kamat, S. S. Fatty acid chain length drives lysophosphatidylserine-dependent immunological outputs (2021) *Cell Chemical Biology*, 28: 1169-1179.

Kulkarni, A; Soni, I.; Kelkar, D.S. Dharmaraja, A. T.; Sankar, R. K.; Beniwal, G.; Rajendran, A.; Tamhankar, S.; Chopra,S.; Kamat, S. S.; Chakrapani, H.

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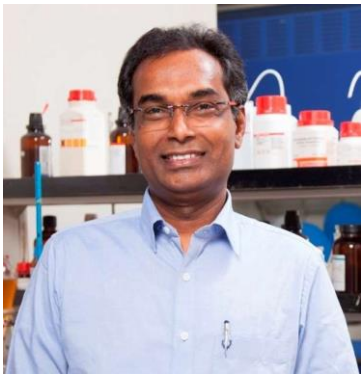


- Dr. Srivari Chandrasekhar has made significant contributions in diverse areas of organic chemistry especially in chiral chemistry and total synthesis of biologically active natural products (marine natural products with architectural complexity).
- The development of PEG as a novel solvent medium created a totally different platform forpractitioners of Green chemistry.
- Development of new methodologies for C-C bond formation reactions involving organo-catalysisand organo-metallic reagents is highly cited.
- Process development and drug discovery in collaboration with pharmaceutical industry have resultedin development of economically viable processes and lead compounds.
- He has 300 publications and 22 patents with over 7000 citations.
- 80 students have already obtained their Ph.D. award under his able guidance and 20 students arecurrently pursuing their research work with Dr. S. Chandrasekhar.
- He was awarded A V Rama Rao Chair in 2020
- His team was awarded CSIR Technology Award 2021 for the process for vaccine adjuvant inCovaxin, 2020, for the process of Favipiravir and 2014 for the process of Misoprostol in 2014.
- He received the Golden Jubilee Commemoration Medal (Chemical Sciences 2020) from INSA.
- He has been honoured by Chemical Research Society of India (CRSI) by CRSI Silver Medal for hisextensive and outstanding contributions to research in Chemistry.
- He has been selected for the Astra Zeneca Research Endowment Award for the year 2019.
- He is recipient of Infosys Prize 2014 for Physical Sciences, CNR Rao National Prize in Chemical Research 2012, SASTRA-CNR Rao award for excellence in Material and Chemistry in 2017, GoyalPrize in Chemical Sciences 2017 and VASVIK Award 2018 for Chemical Sciences and Technology.
- He received Sir C V Raman Birth Centenary Award for 2018.
- He is a recipient of the National Academy of Sciences-Reliance platinum jubilee award in physical sciences for work on innovations in applied research with fundamental approach.
- He has been awarded the Ranbaxy Research award in Pharmaceutical Sciences-2009 for hiscontributions to total synthesis of natural products and medicinal chemistry.
- He is a fellow of the Indian Academy of Sciences, Indian National Science Academy and NationalAcademy of Sciences.

Abstract

Ideal synthesis to Net Zero Synthesis: why and how?

S. Chandrasekhar
Secretary, Department of Science and Technology, Govt. of India

Organic Chemistry, since Wohler's Urea synthesis, has undergone transformations beyond the imagination of the early chemists. The functionality and complexity have been the two driving factors in choosing targets for synthetic organic chemists since then. The legacy created by the duo of Woodward and Corey continues to inspire us in creating a wealth of products which have changed the way we live. However, in this journey, the key elements viz., the green chemistry principles including atom economy, reagent economy, solvent economy and more importantly energy economy were not the key drivers. Rather, the primary demands have been the scalability and adaptability by the industry for mass production. The pharma and agro industries, with large volumes of effluents and by-products, have got criticism from masses while the products have changed the way we live including the quality of life. To overcome this criticism and also to minimize the adverse impacts on environment, the experimental organic chemistry has begun a new innings following quality by design in industry and ideal synthesis in academic efforts.

The current talk will attempt to discuss the learnings from the past, the present status and a way forward. Few examples from speaker's own research group will be presented as case studies.

D. Srinivasa Reddy
Director
CSIR-Indian Institute of Chemical Technology, Hyderabad
Director (additional charge)
CSIR-Indian Institute of Integrative Medicine, Jammu
Email: ds.reddy@iict.res.in

Background/Experience

- PhD, University of Hyderabad, 2000 (Advisor: Professor Goverdhan Mehta).
- Post-doctoral with Prof. Sergey A. Kozmin (University of Chicago, USA) and Prof. JeffreyAubé (University of Kansas, USA)
- 20+ Years of research experience (post-PhD) in total synthesis of natural products/ medicinalchemistry/ drug discovery
- 7 Years of experience in pharmaceutical industry (Dr.Reddy's & TATA Advinus), A moleculediscovered by his team at industry is currently in human phase-II clinical trials (Licogliflozin)
- Out-licensed patent/technology (two nos.) developed by team at CSIR-NCL
- Author of ~120 publications and an inventor in ~35 patents

Awards/Recognitions

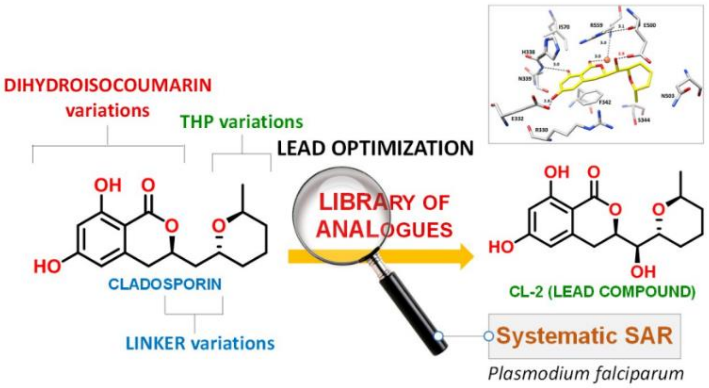
- J. C. Bose National Fellowship by SERB, DST, Govt. of India
- Shanti Swarup Bhatnagar Prize in chemical sciences
- Fellow of the Indian Academy of Sciences, India (FASc)
- Fellow of the National Academy of Sciences, India (FNASc)
- NASI-Reliance Industries Platinum Jubilee Award in the field of physical sciences
- Sun Pharma Research (Ranbaxy) Award in the field of pharmaceutical sciences
- OPPI Scientist Award for contributions in pharmaceutical sciences
- Nominated member of the scientific body of Indian Pharmacopoeia, Govt. of India
- CRSI Bronze Medal in chemical science
- CDRI Award for Excellence in drug discovery research - chemical sciences
- Editor of Bioorganic & Medicinal Chemistry Letters (BMCL), an Elsevier journal

Abstract

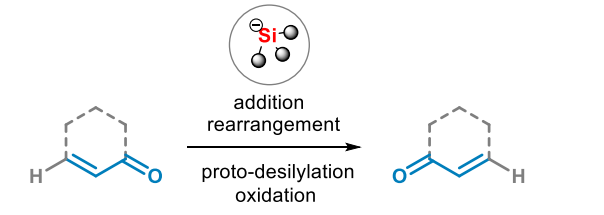
Lead Optimization of Antimalarial Natural Product Cladosporin and New Methods using Silicon Chemistry

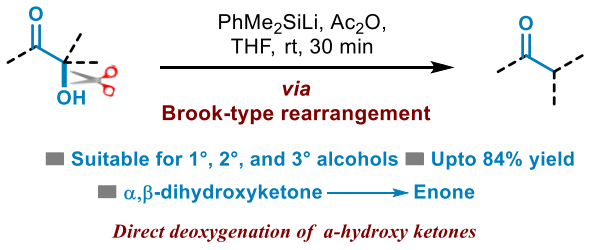
D. Srinivasa Reddy
CSIR- Indian Institute of Chemical Technology, Hyderabad

Our research group focuses on total synthesis of biologically active compounds and medicinal chemistry with an ultimate aim of discovering drugs. Cladosporin, an anti-malarial natural product was found to exhibit *nano* molar potency against *Plasmodium falciparum* specifically targeting parasitic lysyl *t*RNA synthetase, an enzyme crucial for parasitic protein bio-synthesis. As part of lead optimization, structure based drug designing approach was adopted to generate a library of analogues around the scaffold which was screened using enzyme-based binding and in-vitro inhibition assay. Details of cladosporin project will be discussed.



In second part, Silicon chemistry based methods will be discussed. In our lab, while working on silicon switching approach in molecules to modulate their drug like properties, we discovered two beautiful methods by using silicon to change the dilemma of conventional approach. Enone transposition with the help of silyl group masking, and the direct deoxygenation of α-hydroxy ketones using a silyl lithium reagent and acetic anhydride.





M. MANOHARAN
Senior Vice President,
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Dr. Muthiah (Mano) Manoharan serves as a Senior Vice President of Drug Innovation, a Scientific Advisory Board Member, and a Distinguished Research Scientist at Alnylam Pharmaceuticals, Cambridge, Massachusetts, USA. In 2003, he was the first chemist hired at Alnylam and built the Drug Discovery team at Alnylam. He and his team pioneered the discovery and development of the chemical modifications that make RNA interference-based human therapeutics possible. This work led to ONPATTRO (patisiran), the first RNAi therapeutic approved by FDA in 2018 for treating TTR amyloidosis mediated polyneuropathy. Dr. Manoharan has had a distinguished career as a world-leading chemist in the areas of oligonucleotide chemical modifications, conjugation chemistry, and delivery platforms (lipid nanoparticles, polymer conjugates, and complex-forming strategies). Dr. Manoharan and his research group designed, synthesized and demonstrated for the first time the human therapeutic applications of GalNAc-conjugated oligonucleotides at Alnylam, a platform that has revolutionized the RNA therapeutics field with several compounds presently in the advanced clinical trials. The very first GalNAc-siRNA conjugate among them, GIVLAARI (givosiran), for the treatment of acute hepatic porphyria (AHP) has been approved by FDA very recently (November 2019). He is an author of more than 215 publications (nearly 44,500 Google Scholar citations with an h-index of 97 and an i10-index of 375) and over 400 abstracts, as well as an inventor of over 240 issued U.S. patents. Prior to Alnylam, Dr. Manoharan worked at Ionis (formerly Isis) Pharmaceuticals (1990-2003; Carbohydrate modifications like 2'-O-MOE and Conjugates) and LifeCodes Corporation (1988-1990) in the field of antisense oligonucleotide therapeutics.

Abstract

Biomimetic Chemistry and RNA Therapeutics

Muthiah Manoharan,
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According to Professor Ron 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. Patisiran (ONPATTRO®), which in 2018 was the first siRNA approved for clinical use, is used to treat polyneuropathy in patients with hereditary ATTR amyloidosis. The approval of patisiran validated the LNP platform for delivery of nucleic acids for human therapeutics, and LNPs are now used to deliver mRNA-based vaccines and gene editing mediators. Conjugation of the GalNAc ligand to an siRNA mediates it uptake into liver hepatocytes through the asialoglycoprotein receptor, and the human therapeutic utility of this receptor-ligand pair for delivery of nucleic acids was fully realized in 2019 with the approval of givosiran (GIVLAARI®) for treating acute hepatic porphyria. This delivery platform has revolutionized the nucleic acid-based therapeutics field. Three other GalNAc-conjugated RNAi therapeutics have been approved to date: lumasiran (OXLUMO®) for the treatment of primary hyperoxaluria type 1, inclisiran (LEQVIO®) for treatment of hypercholesterolemia, and vutrisiran (AMVUTTRA®) for treatment of ATTR amyloidosis. Several other GalNAc-conjugated siRNAs are in advanced clinical testing. This presentation will cover the molecular basis 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.

Panacea Biotech & Jubilant Life Sciences Session

Chairpersons: Vishal Rai & Namrata Rastogi

VISHAL RAI
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IISER, Bhopal.
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Dr. Vishal Rai obtained his Ph.D. in Chemistry from IIT Bombay (2003-2008). He subsequently held a postdoctoral position and MITACS-Elevate fellow position at the University of Toronto, Canada (2008-2011). His contributions to peptide macrocycles created the platform for Encycle Therapeutics. Later, he joined the Department of Chemistry at IISER Bhopal in 2011.

Positions, Awards, and Honours:

He is the Founder and Director of *Plabeltech Private Limited*. The state-of-the-art protein and antibody engineering technologies such as LDM®, Gly-Tag®, and Maspecter® empower the company. Recently, his team established the PrecisionAntibody Engineering CEnter (*SERB-PACE*) to meet India's technological demands in biologics. Also, he is the recipient of the Swarnajayanti Fellowship, Ramanujan Fellowship, CRSI Bronze Medal, CDRI Award for excellence in drug research, SERB Technology Translation Award, RSC-WIS Young Scientist Award, and DAE Young Scientist Award. Recently, he joined the *ACS Chemical Biology* team as an Early Career Board member. He hasbeen involved in scientific outreach activities as national co-chair (India) for the InternationalChemical Biology Society (ICBS). Also, he is an invited Fellow of the Royal Society of Chemistry (FRSC), UK.

Research interests:

His research group is leading the development of chemical technologies for the *precision engineering of proteins*. They are also involved in synthesizing homogeneous therapeutic proteins, antibody-conjugates, protein immobilization, and analytical tools for peptides and proteins. His research team wants to contribute to Society through homogeneousbioconjugates for directed cancer chemotherapeutics and surgical oncology. Besides, they areinvesting efforts to make small-molecule precision therapeutics possible in the future.

NAMRATA RASTOGI
Principal Scientist
Central Drug Research Institute (CDRI)
Lucknow
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Education:

Research Scholar (January 2001-July 2006) Indian Institute of Technology, Bombay, India Supervisor: Professor Irishi N. N. Namboothiri

Postdoc:

Postdoctoral Research Associate (September 2006-March 2007) Indian Institute of Technology, Kanpur, India Supervisor: Professor Vinod K. Singh
Postdoctoral Research Associate (May 2007-April 2009) University of Minnesota, Minneapolis, USA Supervisor: Professor Ramaiah Muthyala

Positions:

Scientist (March 2011-March 2016) CSIR-Central Drug Research Institute (CSIR-CDRI), Lucknow, India
Senior Scientist (March 2016-till date) CSIR-Central Drug Research Institute (CSIR-CDRI), Lucknow, India
Senior Scientist, Jubilant Biosys Ltd, Bangalore (2009-2011)

Awards & fellowships:

Distinguished Woman Scientist-2019 in Chemical Sciences" by Indian Society of Chemists & Biologists
CSIR-CDRI's Incentive Award-2019
CSIR-CDRI's Incentive Award-2015
INSA-DFG fellowship, University of Regensburg, Germany (July-September, 2014)
Gregynog Young Organic Chemist-2015

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Jérôme Lacour was educated at the École Normale Supérieure (Ulm, Paris). He holds an *Agrégation* in Physical Sciences (major in Chemistry) and obtained in 1993 his Ph.D. in Chemistry at the University of Texas at Austin under the supervision of Prof. Philip D. Magnus. After post-doctoral studies in the laboratory of Prof. David A. Evans at Harvard University, he joined the Organic Chemistry Department of the University of Geneva in 1995. In 2001, he received the Sandoz Family Foundation professorship. Since 2004, he holds a full professor position in the department. Currently, his primary research interests are in asymmetric synthesis and catalysis using organic, physical organic, organometallic and coordination chemistry tools.

Jérôme Lacour teaches general organic chemistry to 1st year biology and pharmacy students. He also lectures on physical organic chemistry to 3rd year and graduate students, and on current stereochemistry problems to graduate and postgraduate. He is a member of the Editorial Advisory Board of *Chemical Society Reviews*, *Chemical Science*, *Chem* and a Board member of *Chirality*. He is also a member of the International Scientific Committee of the *International Symposium on Chirality*.

Distinctions, Awards and Prizes:

- Faculty of Science, University of Geneva, Dean (2014-)
- Visiting Professorships: Nagoya (2018), Bordeaux (2013), Haifa (2012), École Centrale Marseille (2010), Strasbourg (2009), Angers and Dijon (2008), Lyon (2000)
- *EUCHEM "Bürgenstock" Conference on Stereochemistry*, Organizing Committee (2008-2017)
- Taiwan Chemistry Research Promotion Center, Visiting lectureship (2014)
- International Organic Chemistry Foundation (IOCF) lectureship, Japan (2014)
- Vice-Dean of the Faculty of Science, University of Geneva (2010-2014)
- *Chimia*, Editor-in Chief (2011-2014)
- Geneva Chemical Society, President (2010-2013)
- "Chirality 2008", the 20th International Symposium on Chirality, Chair
- COST Action D31, Vice-Chair (2007-2009)
- National Science Council, Taiwan, Visiting Lecturer (2007)
- 2006 Holger Erdtman Lecturer (KTH, Sweden)
- Grammaticakis-Neuman Prize, French Academy of Sciences (2005)
- Werner Prize and Medal, Swiss Chemical Society (2002)
- Sandoz Family Foundation Professorship (2001-2004)
- Synthélabo Postdoctoral Fellowship (1993-1994)

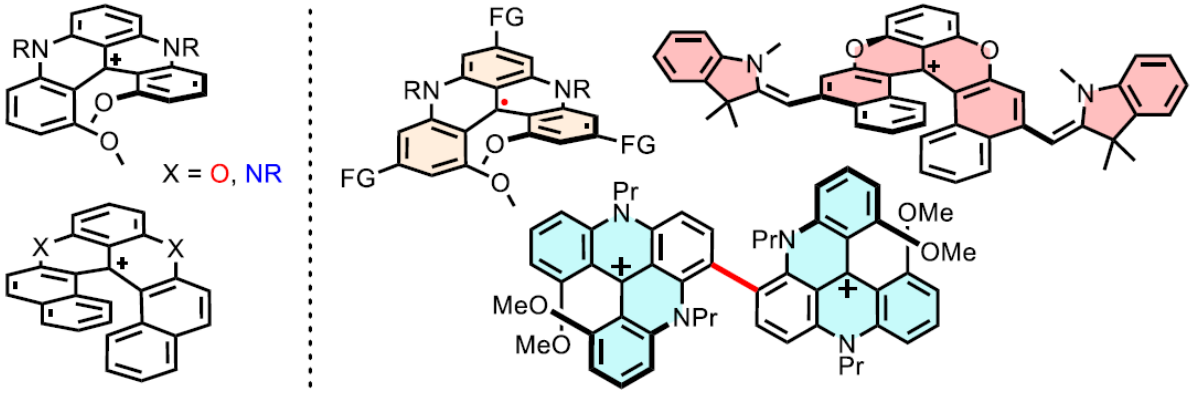
Abstract

Chiral Trityls as Versatile Property and Reactivity Platforms – from Oxidative C-C Couplings to Permanent Radicals

Jérôme Lacour

Department of Organic Chemistry, University of Geneva, Switzerland

Studies on cationic [4] and [6] helicenes will be the focus of the presentation. These compounds display original chemical and electronic properties thanks to the extended delocalization provided by the triarylcarbenium framework.[1] An emphasis will be given on regio-divergent late-functionalization routes and strategies, and how they enable original redox properties for the making of permanent neutral radicals to oxidative C-C bond formations of various kinds.[2]



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(1) Bosson, J.; Bisballe, N.; Laursen, B. W.; Lacour, J., Cationic Triarylcarbenium Helicenes: Synthesis, Resolution and Applications. In *Helicenes. Synthesis, Properties and Applications*, Crassous, J.; Stara, I. G.; Stary, I., Eds. Wiley-VCH: 2022; pp 127-165.

(2) (a) Bosson, J.; Labrador, G. M.; Besnard, C.; Jacquemin, D.; Lacour, J., *Angew. Chem. Int. Ed.* **2021**, *60*, 8733-8738. (b) Frédéric, L.; Fabri, B.; Guénée, L.; Zinna, F.; di Bari, L.; Lacour, J., *Chem. Eur. J.* **2022**, e202201853. (c) Nikolova, Y.; Fabri, B.; Moneva Lorente, P.; et , *Angew .Chem. Int. Ed. Engl.* **2022**, e202210798.

JARUGU NARASIMHA MOORTHY
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Vithura, Thiruvananthapuram,
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Dr. J. N. Moorthy obtained Ph.D degree from the Organic Chemistry Department of Indian Institute of Science, Bangalore in 1994. He pursued postdoctoral research in University of Houston, USA, University of Wuerzburg, Germany and University of Victoria, Canada prior to joining the Chemistry Department, IIT Kharagpur in 1998. After a 5-month stint, he moved to IIT Kanpur. He has been a full professor at IITK since 2008. He moved to IISER Thiruvananthapuram as the Director in April 2019.

He is a recipient of AvH postdoctoral research fellowship, Germany (1995-96), young chemist award, and bronze and silver medals of Chemical Research Society of India (CRSI), India. He received Shanti Swarup Bhatnagar Prize in Chemical Sciences, India (2008), and Sastra-CNR Rao award in Chemical Sciences (2020). He is a Fellow of Indian Academy of Sciences Bangalore (2010), Fellow of Royal Society of Chemistry (2014) and Fellow of Indian National Science Academy (2018). He has also been a J. C. Bose National Fellow since 2015. He has been on the editorial boards of New J. Chemistry, J. Chem. Sci. and Int. J. Photoenergy. He is presently an associate editor of J. Chem. Sci.

His interests are in the areas of supramolecular chemistry, organic materials, mechanistic organic chemistry, and organic photochemistry.

Abstract

Photoresponsive MOFs and Catalytic POPs by Bottom-up De Novo Molecular Design

Jarugu Narasimha Moorthy
School of Chemistry, IISER Thiruvananthapuram, Vithura, Thiruvananthapuram, Kerala and Department of Chemistry, IIT Kanpur, Kanpur, Uttar Pradesh

The properties of macroscopic bulk materials can be maneuvered in a bottom-up fashion by programming the constituent molecules to organize in a certain way. In essence, the molecular structure is an embodiment of the properties of macroscopic bulk material.

I will present some results of our research in the last few years on development of functional materials in a bottom-up fashion. I will exemplify the development of photoresponsive metal-organic framework materials (MOFs and MONs),[1,2] and catalytic porous organic polymers (POPs) by rational design of constituent molecular building blocks.[3]

References:

1) a) Moorthy, J. N.; Mandal, S.; Mukhopadhyay, A.; Samanta, S. *J. Am. Chem. Soc.* **2013**, *135*, 6872; b) Mukhopadhyay, A.; Maka, V.; Moorthy, J. N. *Photochem. Photobiol. Rev. C.* **2016**, *29*, 73; c) A. Mukhopadhyay, V. Maka, G. Savitha, J. N. Moorthy, *Chem (Cell Press)*, **2018**, *4,* 1069. d) Jana, K.; Moorthy, J. N. *Chem. Eur. J.* **2022**, ASAP.

2) a) P. Chandrasekhar, A. Mukhopadhyay, G. Savitha, J. N. Moorthy, *Chem. Sci.* **2016**, *07*, 3085. b) P. Chandrasekhar, A. Mukhopadhyay, G. Savitha, J. N. Moorthy, *J. Mater. Chem. A.* **2017**, 5, 5402. c) V. Maka, A. Mukhopadhyay, Moorthy, J. N. *Nanoscale,* **2018***, 10*, 22389*.* d) V. Maka, A., J. N. Moorthy, *Chem. Eur. J.* **2019***, 25*, 3835. e) Maka, V. K.; Tamuly, P.; Jindal, S.; Moorthy, J. N. *App. Mater. Today* **2020**, *19*, 100613. f) Jindal, S.; Maka, V.K.; Anjum, G.; Moorthy, J. N. *ACS Applied Nano Materials* **2021**, *04*, 449. g) Tamuly, P.; Sama, F.; Moorthy, J. N. *Adv. Mater. Interfaces* **2022**, 2200337.

3) a) Yadav, C.; Maka, V. K.; Payra, S.; Moorthy, J. N. *J. Catal.* **2020**, *384*, 61. b) Yadav, C.; Maka, V.; Payra, S.; Moorthy, J. N. *ACS Applied Polymer Materials* **2020** *2,* 3084-3093, c) Yadav, C.; Sahoo. A. K.; Moorthy, J. N. *ACS Appl. Nanomater.* **2022**, 5, 14296. d) Yadav, C.; Payra, S.; Moorthy, J. N. *J. Catal.* **2022**, 414, 769.

ANINDITA DAS
Assistant Professor
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Indian Association for the Cultivation of Science
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Anindita Das received her Ph.D. under the supervision of Prof. Suhrit Ghosh from the Indian Association for the Cultivation of Science (IACS), Kolkata, India in 2014. Subsequently, she worked as an Alexander von Humboldt Postdoctoral Fellow with Prof. Patrick Théato at the University of Hamburg, Germany. In 2016, she moved to the group of Prof. E. W. Meijer at the Eindhoven University of Technology, Netherlands, for her second postdoctoral reseach. In 2017, she joined as a Faculty Fellow at IACS, where she currently holds the position of Assistant Professor in the School of Applied and Interdisciplinary Sciences. Her research interests include supramolecular assemblies of functional π-systems and macromolecules employing halogen-bonding and other underexplored supramolecular interactions, crystallization-driven macromolecular assemblies and biodegradable polymers.

She is the recipient of the following honours and awards,

- Associate of the Indian Academy of Sciences 2022
- DAE-BRNS Young Scientist Research Award 2022
- Her profile has been published in *Angew. Chem. Int. Ed.* 2022.
- Early Career Advisory Board Member of the Journal *ChemNanoMat* since 2022.
- Editorial Board Member of the *Journal of Macromolecular Science, Part A: Pure and Applied Chemistry* since 2022.
- IUPAC-Solvay International Award for Young Chemists (2015) for best PhD thesis under Honorable Mention Award Category.
- Alexander von Humboldt Postdoctoral Fellowship 2014.

Abstract

Crystallization-Driven Programmable Two-Dimensional (2D) Assemblies from Chromophore-Appended Poly(L-lactide) Homopolymers

Anindita Das
School of Applied and Interdisciplinary Sciences, Indian Association for the Cultivation of Science

Supramolecular assemblies of functional π-conjugated systems are mostly restricted to spherical or one-dimensional (1D) structures, with only a few examples of two-dimensional (2D) architectures reported. Crystallization-driven self-assembly (CDSA) of semicrystalline block copolymers (BCPs) has recently emerged as a powerful technique for fabrication of a wide range of hierarchical anisotropic structures, including 2D architectures.[1] We present a novel CDSA method for the programmed synthesis of discrete 2D architectures with exciting photophysical properties and predictable morphologies from chromophore-conjugated poly(L-lactides) (PLLAs). PLLA homopolymers, end-functionalized with different dipolar chromophores such as merocyanine (MC) or naphthalene monoimide (NMI) and nonpolar pyrene (PY) or benzene (Bn), crystallize into precise diamond-shaped 2D platelets in isopropanol under suitable conditions. This causes the terminally attached chromophores to assemble into a 2D array on the platelet surface by either dipole-dipole interactions (for NMI and MC) or aromatic stacking (PY and Bn), which leads to aggregation-induced enhanced emission (AIEE) with tunable emission wavelengths within the 2D crystals, depending upon the nature of the end-capped chromophores.[2] Further, co-assembly between NMI- and PY-functionalized PLLAs yielded similar two-component co-platelets with highly efficient Förster resonance energy transfer (FRET) from the donor (PY) to the acceptor (NMI) dye with remarkable efficiency (~80%) on the 2D surface. Moreover, the "living" CDSA method was employed to achieve hierarchical segmented block co-platelet structures using one of the homopolymer platelets as the "seed" and the unimer of the other as the "monomer reservoir."[2] Following that, the structural properties of two homopolymers with opposing chirality, poly(D-lactide) and poly(L-lactide), which are known to form stereo-complex cocrystals in bulk, were investigated. By incorporating the same donor and acceptor dyes that hold the FRET relationship at the chain ends of the two enantiomers, we were able to monitor the stereo-complex co-platelet formation in the solution phase, whose similar diamond-shaped 2D structure showed enhanced stability as compared to the individual homocrystals.[3] Further, we studied the scope of these multicomponent, self-assembled 2D systems for dye encapsulation or surface decoration with external fluorescent dyes for cascade energy transfer and white light emission.[3]

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2) Rajak, A.; Das, A. *Angew. Chem. Int. Ed.* **2022**, *61*, e202116572. (Selected as a Hot Paper and Cover Picture).
3) Rajak, A.; Das, A. *Manuscript under preparation.*

SEERGAZHI G. SRIVATSAN
Professor, Department of Chemistry
Wellcome Trust-DBT India Alliance Senior Fellow
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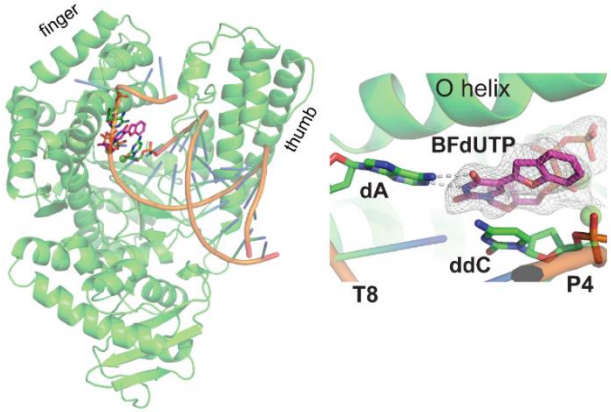
S. G. Srivatsan received his master's degree in Chemistry from Indian Institute of Technology, Madras in 1995 and Ph. D. in Bioorganic Chemistry from Indian Institute of Technology, Kanpur in 2003 under the supervision of Prof. Sandeep Verma. He was an Alexander von Humboldt postdoctoral fellow with Prof. Michael Famulok at University of Bonn, Germany, where he developed catalytic RNAs and pharmacophores that target protein-RNA complexes and their enzyme activity. Subsequently, he joined Prof. Yitzhak Tor group as a postdoctoral fellow in University of California, San Diego. He joined Indian Institute of Science Education and Research (IISER), Pune in November 2008. He is currently a Professor and Wellcome Trust-DBT India Alliance Senior Fellow. He received the CDRI AWARDS–2019 for Excellence in Drug Research, Chemical Research Society of India Bronze medal (2020), National Prize for Research on Chemistry of Peptides and Nucleic Acids (2020, sponsored by Professor CNR Rao Education Foundation) and Sun Pharma Research Award (2020) in Pharmaceutical Sciences. He also serves as an Editorial Advisory Board member of ACS Bioconjugate Chemistry. His research interests lie in the area of nucleic acid chemistry and biophysics, particularly in the development of nucleoside probes for studying nucleic acid structure and function, nucleoside-based self-assemblies, and nucleic acid labeling and imaging tools.

Abstract

Probing DNA polymerase activity in real time and 3D using functionalized nucleotide analogs

S. G. Srivatsan
Indian Institute of Science Education and Research (IISER), Pune, India 411008

DNA and RNA polymerases and nucleotide transferases are widely used in introducing functionalities that aid in the structural and functional analysis of nucleic acids. Though it is difficult to predict the substrate tolerance of these enzymes, nucleotides modified at the nucleobase serve as good substrates for enzymatic incorporation. However, the molecular basis by which these enzymes incorporate, and process functionalized nucleotide substrates is not yet fully understood. In this context, biochemical and X-ray techniques have been used to study the mechanism of incorporation of few of the modified nucleotides. The results from these studies are indicative, and hence, a detailed understanding of the chemical space tolerance of the polymerases is required. For a decade now, we have been interested in developing microenvironment-sensitive nucleoside analogs that help in probing the structure and ligand binding properties of therapeutic nucleic acid motifs.[1-6] In this presentation, I will describe the development of a novel platform to probe the chemical space tolerance and the mechanism of incorporation of DNA polymerases by fluorescence and X-ray crystallography using our environment-sensitive nucleotide probes.



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Dr. Ponneri C. Ravikumar obtained his M.Sc (Organic Chemistry) from the University of Madras in the year 2002. He completed his Ph.D. at the Indian Institute of Science (IISc), Bangalore, India in 2006. Subsequently he moved to USA for his first postdoctoral stint at Duquesne University, Pittsburgh. He moved to Yale University, New Haven for his second postdoctoral stint. He joined as Assistant Professor at the Indian Institute of Technology (IIT), Mandi, Himachal Pradesh in the year 2010. He continued there until 2015, then he moved to National Institute of Science Education and Research (NISER), Bhubaneswar, Odisha, where he is currently an Associate Professor. He has been awarded the chemical research society of India (CRSI) Bronze medal for the year 2023. He has received teaching excellence award as well as foundation day awards for institute service while serving at IIT Mandi. Apart from teaching and research he also served actively in administrative positions such as Associate Dean (Planning and Infrastructure) at IIT Mandi and Head, Estate Management and Works Department at NISER Bhubaneswar.

Abstract

Palladium Catalysed C-C bond Activation of Strained Carbocyclic Ring Systems: A Promising Strategy in Organic Synthesis

Ponneri C. Ravikumar
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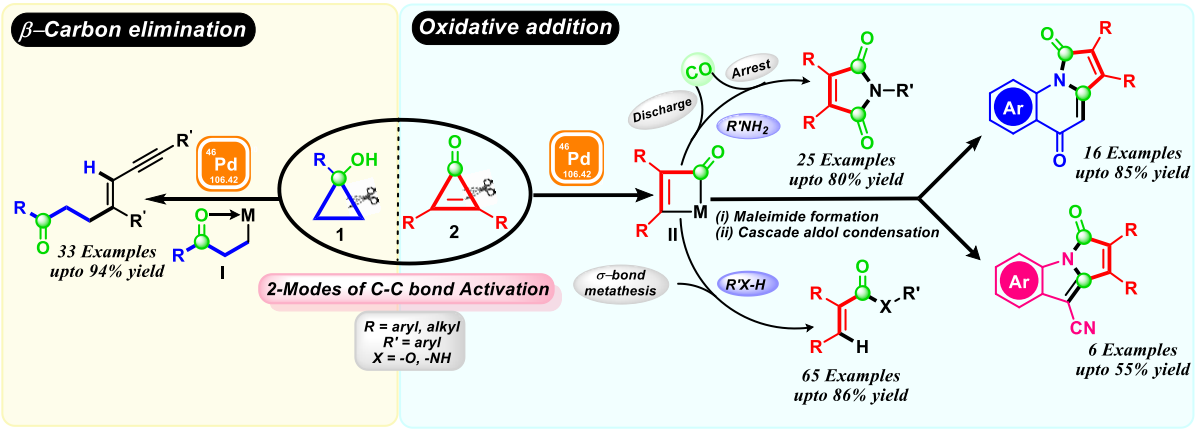
Homi Bhabha National Institute (HBNI), Mumbai

Abstract: During the last century direct functionalization of inert bonds such as the C-C bond has been largely ignored due to its high bond strength and inertness. Since the beginning 21st century there has been renewed interest in functionalizing inert bonds through palladium catalyst for the synthesis of many useful organic molecules. As compared to C-H bond functionalization, C-C bond functionalization is far more difficult due to the high thermodynamic barrier in breaking the C-C bond. One useful strategy to overcome high thermodynamic barriers is to use strained ring systems as substrates. In our group, we have employed this strategy for the synthesis of heterocycles and useful organic scaffolds. A brief overview of the works completed so far, and our ongoing works will be presented.



Palladium-catalyzed C-C bond functionalization of Cyclopropenones and Cyclopropanols

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AVRA-IICT Session

Chairpersons: T. Punniyamurthy & Santanu Mukherjee

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Punniyamurthy completed his graduate studies at Bharathidasan University and doctorate atIIT Kanpur under the supervision of Professor Javed Iqbal. He then pursued postdoctoral research at North Dakota State University (Prof. M P Sibi), Kyushu University (Prof. T Katsuki), Montpellier University (Professor Andre Vioux) and National School of Chemistry, Montpellier (Prof. J E Moreau). Since July 2001, he is in IIT Guwahati and his research interest is Sustainable Organic Synthesis. He has produced 7 Postdocs, 25 Ph.D. Scholars and 36 M.Sc. students, and edited a book with a co-editor entitled "*Transition- Metal-Catalyzed C-H Functionalization of Heterocycles*" for Wiley publishers, which is under press. He is also Guest Editor along with a Co-editor for Synthesis Special Issue on "*C-H Bond Functionalization of Heterocycles*" which is under progress. He has published 160 papers in peer-reviewed Journals along with Seven Book Chapters for Wiley and Oxford University Press publishers, having citations of 9300 and h-index 48. He served as the Head, Department of Chemistry and Chairman JAM, and is presently the Chief Vigilance Officer as well as Member of Board of Governors, IIIT Guwahati. He has receivedthe Distinguished Alumni Award, Bharathidasan University. He has been also Visiting Professor at Oxford University, Kyushu University and The Scripps Research Institute, SanDiego and the recipient of JSPS, Fulbright and UKIERI Research Fellowships and CRSI Bronze Medal. He is the elected Fellow of the Indian Academy of Sciences, the National Academy of Sciences, India and the Royal Society of Chemistry.

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- December 2015 to December 2021: Associate Professor at the Department of Organic Chemistry, Indian Institute of Science, Bangalore, India
- April 2010 to December 2015: Assistant Professor at the Department of Organic Chemistry, Indian Institute of Science, Bangalore, India
- 2008 to 2010: Postdoctoral Fellow at Harvard University, Cambridge, USA (*Advisor: Prof. E. J. Corey*)
- 2006 to 2008: Postdoctoral Fellow at Max-Planck Institute fuer Kohlenforschung, Muelheim an der Ruhr, Germany (*Advisor: Prof. Benjamin List*)

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- Chemical Research Society of India (CRSI) Bronze Medal (2019)
- Associate Editor, *Organic & Biomolecular Chemistry* (since 2019)
- Fellow of the Royal Society of Chemistry (FRSC) (2018)
- Member of the Editorial Advisory Board of the *Journal of Organic Chemistry* (2018-2020)
- Dr. Basudev Banerjee Memorial Award for the year 2015 by Indian Chemical Society (2016)
- Dr. Srinivasan Rajagopalan Award by IISc Alumni Association (2015)
- Prof. Priti Shankar Teaching Award for Assistant Professors in Science for the year 2014 (2015)
- Alkyl Amines-Institute of Chemical Technology (ICT) Young Scientist Award (2014)
- INSA (Indian National Science Academy) Medal for Young Scientist (2014)
- NASI (National Academy of Sciences, India)-Young Scientist Platinum Jubilee Award (2013)
- Associate of the Indian Academy of Sciences, Bangalore (2012-2015)
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Thai grew up in the state of Tamil Nadu in India, where he spent early childhood near the city of Tirunelveli and his college years in the beautiful temple city of Madurai. He obtained his Bachelors and Masters degrees in Chemistry from The American College in Madurai. Following this, he obtained his Ph.D. degree working in organolithium chemistry, under the guidance of Professor Peter Beak at the University of Illinois at Urbana-Champaign. After a postdoctoral stint with Professor Seth R. Marder at the California Institute of Technology, working on developing optoelectronic materials, he started his independent career as an Assistant Professor at Tulane University. After four years at Tulane, he moved the lab to the University of Massachusetts Amherst in 2003.

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7/03 – Present	Faculty, Molecular and Cellular Biology Program, University of Massachusetts Amherst, Massachusetts
8/15 – Present	Director, Center for Bioactive Delivery, Institute for Applied Life Sciences, University of Massachusetts Amherst, Massachusetts
9/15 – Present	Director, U. S. Army Research Office funded MURI Center for Triggerable Multi-scale Responses in Organized Assemblies
9/17 – 8/20	Director, Center for Autonomous Chemistry – a National Science Foundation funded Center for Chemical Innovation
9/08 - 9/13	Director, U. S. Army Research Office funded Center for Generation of Green Energy Technologies
5/07 – 9/17	Director, Collaborative Undergraduate Research in Energy (CURE) – a National Science Foundation funded for Research Experience for Undergraduates
5/06 – 5/15	Founder and Co-director, Massachusetts Center for Renewable Energy Science and Technology, University of Massachusetts, Amherst, Massachusetts
9/07 – 8/10	Director, Fueling the Future Center for Chemical Innovation – a National Science Foundation funded Center

Abstract

Bioreactive and Biorthogonal Transformations for Labeling and Conjugating Proteins

S. Thayumanavan
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For chemical transformations to be adopted for practical use in biological systems, a reaction must be simple, high yielding, and compatible with biological molecules. In this presentation, leveraging combinations of first principles of physical organic chemistry and synthetic organic chemistry to manipulate proteins will be described. These will be discussed under organic transformations for three critically important applications: reactions that enable identification of protein-protein interfaces, reactions that enable target identification in complex mixtures, and reactions that enable the use of proteins as drugs that can directly address a genetic deficiency.

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Abstract

One Scaffold Dual application: Phenothiazine as new scaffold to treat Glioblastoma

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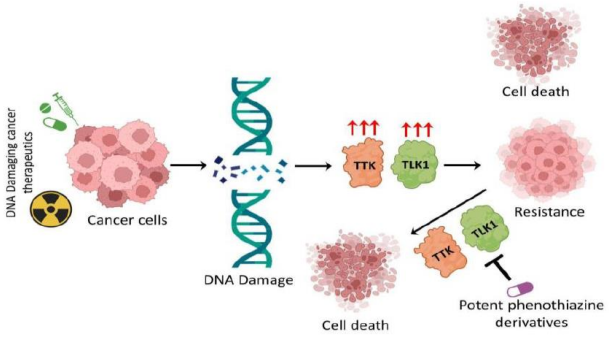
Phenothiazine is an important pharmacophore, and its derivatives are highly bioactive and have widespread use in fields of medicine. Through *In vitro* kinase assays, and kinome screening, we identified and synthesized a novel phenothiazine analog J54 with potent Tousled-line kinase (TLK). TLK1 has been identified as an important drug target for prostate cancer (PCa) and glioblastoma (GBM). [1] It has been investigated that TLK1 causes DDR activation in such mCRCP cells, and the selective inhibition of TLK1 can inhibit the TLK>Nek1> ATR>Chk1 axis in prostate cancer. [2] Unlike other phenothiazine inhibitors like Thioridazine, J54 has a low affinity for dopamine receptors and low anti-dopaminergic activity in animals. Recently, we studied structural modifications of J54 and were able to establish a Structure-activity relationship of phenothiazine with TLK activity. All these preliminary results point towards the therapeutic potential of J54 for GBM, which warrants further investigation. The recent developments will be presented in the talk. [3] For chemical transformations to be adopted for practical use in biological systems, a reaction must be simple, high yielding, and compatible with biological molecules. In this presentation, leveraging combinations of first principles of physical organic chemistry and synthetic organic chemistry to manipulate proteins will be described. These will be discussed under organic transformations for three critically important applications: reactions that enable identification of protein-protein interfaces, reactions that enable target identification in complex mixtures, and reactions that enable the use of proteins as drugs that can directly address a genetic deficiency.



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Dattatraya Dethe obtained Ph.D. in synthetic organic chemistry from Indian Institute of Science, Bangalore in 2005. He subsequently held postdoctoral position in Prof. K.C. Nicolaou's group from 2005-2008. He then joined as a senior scientist in a drug discovery firmAlbany Molecular Research Inc. at Singapore. He then returned back to India and joined National Chemical Laboratory, Pune as a Scientist-E1 from Aug 2009. Later in Dec 2011 he moved to IIT Kanpur and currently working there as professor in the department of chemistry.

His research interests include biomimetic total synthesis of natural products, development of metal catalysed new C-C and C-X bond forming reactions.

He is a recipient of CSIR young scientist award in Chemical Sciences (2011), OPPI young scientist award (2011), AVRA young scientist award (2014) and he was also young associate of Indian Academy of Sciences, Bangalore. He is also recipient of CRSI bronze medal 2020 and SERB-STAR Award-2020. He is also Fellow of National Academy of Sciences, FNASc.

Abstract

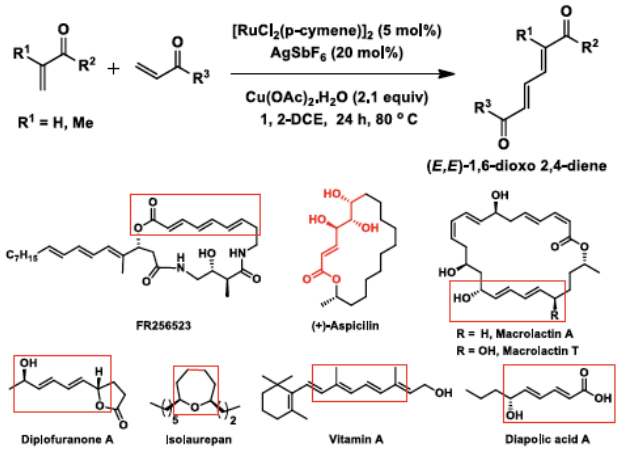
Ruthenium Catalyzed Stereo- and Chemoselective Cross-Coupling of Vinyl Ketones: Application to Total Synthesis of Structurally Diverse Natural Products

Dattatraya Dethe

Department of Chemistry, IIT Kanpur

Synthetic methods that allow the facile construction of 1,3-dienes in stereoselective manner are of great importance in organic synthesis. At present, many of the reported methods for accessing these targets follows the Wittig/Horner−Wadsworth−Emmons reactions or transition-metal-catalyzed cross-coupling reactions. Although robust, these routes possess disadvantages, that they require prefunctionalized starting materials, generate stoichiometric by-products and in some cases deliver *E/Z* product mixtures, which is a major deleterious problem to be circumvented. Therefore, novel and highly atom-economical method for the stereoselective synthesis of dienes utilizing cheap and easily available starting materials that is susceptible to large scale production is highly desirable.

Hence, we have developed a novel, C-C bond forming reaction *via* ruthenium catalyzed oxidative cross-coupling between vinyl ketones, which provides an expeditious and straightforward access to synthetically useful highly functionalized (*E*,*E*)-1,6-dioxo-2,4-diene derivatives in good yields with excellent stereo- and chemoselectivities. This atom-economical protocol has been performed on a gram scale and selectively transformed into valuable dienes, trienes and tetraenes, which are ubiquitous structural units in many biological molecules and essential substrates for fundamental synthetic methods. A wide range of structural features in substrates are well-tolerated, which ensure the universality of our method. The unique power of this method was further illustrated by the synthesis of structurally diverse natural products such as FR252921, aspicillin, vitamin A, ostopanic acid, JA, diapolic acid, isolaurepan, diplofuranone A, *b*-parinaric acid and southern part (C1-C13) of macrolactin-T.



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Position : *NIH Post Doc December 2007– April 2011* **Organization :** Department of Pharmacology, University of Arizona, Arizona USA

Position : *KU Post Doc March 2007– November 2007* **Organization :** Department of Chemistry, Katholeik University, Leuven Belgium

Position : *TWAS Fellow August 2006– February 2007* **Organization :** Department of Chemistry, Federal University of Santa Maria, Brazil

Position : *CSIR-Senior/ Junior Research Fellow February 2002– May 2006* **Organization :** Institute of Himalayan Bioresource Technology, Palampur India

AWARDS/FELLOWSHIPS:

- Fellow of the Royal Society of Chemistry (FRSC).
- NIH Post doc fellowship.
- KU Leuven Post doc fellowship.
- TWAS Post Doc fellowship.
- Junior Research Fellowship by CSIR
- Qualified State Level Eligibility Test (SLET) for lecturer-ship, in Himachal Pradesh, India.
- Merit Scholarship throughout high school.

Abstract

Pursuit of Electron Donor Acceptor Complexes under Visible light assisted Synthetic Manipulations

Anuj Sharma
Department of Chemistry, Indian Institute of Technology Roorkee

Amongst visible light induced photoredox chemistry,[1] EDA-complex based reactions have significant curtailment from the stand point of green chemistry as the reactions do not rely on photoredox-catalysts, intricating redox potentials, and pave way for efficient atom-economical processes. This EDA strategy involves the association of an electron-rich reagent (**donor**) and an electron deficient reagent (**acceptor**) in the form of an EDA complex, which upon absorption in light, triggers a cascade of events leading to the desired product without any exogenous photocatalyst.[2] Based on this theme, our recent work on direct C-2 alkylation of quinoline-*N*-oxides[3] with Katritzky salts[4] *via* visible-light induced catalyst-free deaminative approach will be discussed. In this reaction, Katritzky salts and base were involved to generate an EDA complex, which underwent an intermolecular single electron transfer (SET) to give an alkyl radical intermediate. This alkyl radical intermediate further underwent addition with quinoline-*N*-oxides to access the desired products in excellent yields. This result and similar EDA based unpublished results shall also be presented.

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Sun Pharma & PI Industries Session

Chairpersons: Bhanu Manjunath & C. V. Ramana

BHANU MANJUNATH NARAYAN
Director R & T Centre,
Syngenta Biosciences Pvt Ltd.

Education:

1994 Ph.D "DOCTORATE IN CHEMISTRY" From Jawaharlal Nehru technological University (JNTU) Hyderabad and worked at IICT, HYDERABAD under the guidance of Padmabhusan Dr A V Rama Rao

1989 M Pharm MATER OF PHARMACY, Institute of Chemical technology ICT,Formerly UDCT, Mumbai University

2004 PGDIPM Post graduate diploma in Intellectual property Management from National Lawschool Bangalore

Work Experience:

2011 – till date Director Syngenta Biosciences Pvt Ltdand Chairman of the Board of Directors of SBPL.

2006 to 2011 Vice President API R & D Watson Pharma Pvt Lts,Head of process R & D and Analytical Development

2003 to 2006. Assistant Director, Lupin labs Pvt Ltd, Pune1994 to 2003 Researcher at Cipla ltd, Mumbai

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Dr. Ramana obtained his MSc. from Andhra University, Waltair (1991) and PhD from University of Hyderabad under the supervision of Professor M. Nagarajan (Synthetic Carbohydrate Chemistry). From 1998 to 2001 he was associated with Professor Andrea Vasella at ETH Zurich as a post-doctoral researcher (glycosidase inhibitors). From May 2001 onwards, he had been associated with National Chemical Laboratory (CSIR, India). At NCL, the focus of Ramana's group includes small molecules synthesis by employing transition metal complexes and developing new catalytic methods. The major focus of Dr. Ramana's group is the total synthesis of natural products and biologically important targets with a keen insight into developing new methods and extending the platform for the synthesis of pharmaceutically relevant small molecules. In general, his group is known decorating the total synthesis canvas with metal reagents and demonstrate designing of new synthetic tools involving the orchestration of sequential events in one-pot with one catalyst. In addition to this, his group also works in the areas of beta-peptides, C-saccharides synthesis, glyconanoparticles and application of C–H activation in non-infringing processes development.

He is a recipient CSIR Young Scientist award in Chemical Sciences (2003), NCL's Scientist of the Year award (2009), Professor D. K. Banerjee Memorial Lecture Award - IISc Bangalore (2011) and CRSI Bronze Medal in chemical sciences (2013) and Dr. A.V. Rama Rao Foundation Prize Lecture in Chemistry (2016) and CNR Rao National Prize in Chemical Sciences (2017). He is the fellow of Indian Academy of Sciences (2014, Bengalore). To his credit, he had about 150 publications, 17 patents and 27 students have been awarded PhD. degree under his supervision.

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Burkhard König, born in 1963, received his Ph.D. in 1991 from the University of Hamburg. He continued his scientific education as a post-doctoral fellow with Prof. M. A. Bennett, Research School of Chemistry, Australian National University, Canberra, and Prof. B. M. Trost, Stanford University. Since 1999, he has been a full professor of organic chemistry at the University of Regensburg.

Burkhard König was Chairman of the Association of German Chemistry University Professors (ADUC, 2005-7), of the Liebig Association (2008-12) as well as a member of the board of the German Chemical Society from 2004 to 2008. He is currently a board member of the International Advisory Board of the Institute of Organic Chemistry and Biochemistry of the Czech Academy of Sciences, Prague (since 2004) and the Wiley-VCH/GDCh Publishing Advisory Board. Furthermore, König is an editorial board member of "Chem. Eur. J.", "Eur. J. Org. Chem." (Chair) and "Green Chem." He has authored 440 scientific publications and three books.

Burkhard König was awarded the Reinhard-Koselleck grant of the DFG in 2017, the ERC Advanced Grant in 2016 and the UN-Decade Award on Sustainability in 2011/2012. He also received the literature award of the Fonds of the German Chemical Industry in 2007.

Burkhard König works in physical-organic chemistry and photochemistry. His current research interests are the development of synthetic methods in photoredox catalysis and new photoswitches for photopharmacology. As one of the pioneers of chemical photocatalysis, he has helped to develop the field of light-driven organic synthesis. In his research projects on photocatalysis, Burkhard König always combines the development of synthetically useful methods with detailed mechanistic investigations, often in collaboration with spectroscopists and theoreticians. The understanding of the molecular processes and thus the conceptual development of the field of photocatalysis are central concerns of his research projects.

Abstract

Redox-neutral Photocatalysis – Towards ideal chemical transformations

Burkhard König
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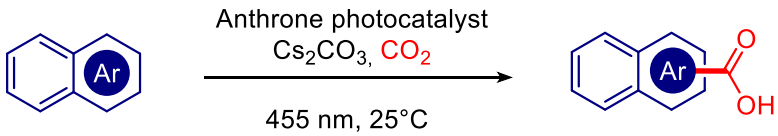
Ideal chemical transformations in terms of green and sustainable chemistry convert abundant, low energy starting materials into high value products without losing a single atom.[1] Light-driven catalysis offers tools for such reactions.[2] We discuss in the lecture key photocatalytic principles and how they can be applied to redox-neutral reactions, such as C-H carboxylations of alkanes and arenes with carbon dioxide.[3] Current scope and limitations are shown and a perspective is given where the use of light may lead to better catalysis.[4]



Redox-neutral photocatalytic C-H carboxylation

Acknowledgement:

DFG Deutsche Forschungsgemeinschaft

erc European Research Council Established by the European Commission

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[4] Wang, H.; Tian, Y.-M.; König, B. *Nature Reviews Chemistry* **2022**, *6*, 745 - 755

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Dr Rajamannar has M.Sc in Chemistry from the University of Madras, Ph.D in Organic Chemistry from IIT, Madras with Prof. K K Balasubramanian, Post-Doctoral work on Carbohydrate Chemistry with Professor Andrea Vasella from University of Zurich, Switzerland.

Dr Rajamannar worked from 1990 to 1993 as a Scientist, in Organic Chemistry, with Prof. T R Govindachari, SPIC Science Foundation in Chennai.

Dr Rajamannar joined Sun Pharmaceutical Industries in 1993, he has filed more than 250 patents and has 37 publications in international journals. His group developed Processes for more than 200 pharmaceutical drug substances, Novel synthetic routes, Polymorphs, and medicinal chemistry in various therapeutic areas of interest.

Recently filed one of the fastest IND from India. First experiment to first-in-human in 30.5 months as against international standard of about 40 months. Predicted to address several of the complex therapies with high safety of margin.

A Recipient of Sir U N Brahmachari Award in 2021, (Prof. Brahmachari was a nominee twice for Nobel Prize, in 1929 & 1942).

Dr Rajamannar is a chairperson of Research Council of CSIR-Indian Institute of Chemical Technology (CSIR-IICT), Hyderabad. Member, Board of Governors (BoG) NIPER, Mohali; Governing council Member of Technology Information, Domain expert, Development of mission mode project on Active Pharmaceutical Ingredients for affordable Health Care (APIs-AHC), CSIR. CSIR Expert committee member for Drug Discovery Research. Member, facility management committee of the SAIF-NMR at IISc Bangalore. Forecasting and Assessment Council (TIFAC), DST Govt. of India. Subject Expert committee member FIST; Ministry of Science and Technology.

Therapeutic targets worked by his team are in the area of Allergy, Inflammation, Respiratory, Oncology, Diabetes, Obesity, NASH & Immunology (Psoriasis, Colitis, MS, Fibrosis, SLE, etc). Expected to have significant benefits and addressing unmet medical needs.

Professional Membership: American Diabetes Association (ADA), European Association for the Study of Diabetics (EASD), European Association for the Study of Liver (EASL) & Chemical Research Society of India (CRSI), Chemical Biology Society India (CBS), American Chemical Society (ACS).

Abstract

Discovery of A Novel, Long-Acting Dual Agonist for GIPR/GLP-1R, HISHS-2001, Demonstrates Effects on HbA1c and Weight Loss in the db/db Mouse Model of Type 2 Diabetes

Dr. Rajamannar Thennati
Sun Pharmaceutical Industries Ltd., India

Glucagon-like peptide-1 receptor agonists (GLP-1RA), provide substantial reductions in HbA1c and significant body weight loss in patients with type 2 diabetes (T2D). Tirzepatide GIPR/GLP-1R dual agonist, which demonstrated an improved clinical performance for both HbA1c and weight loss than GLP-1R agonist/s. In May 2022, the FDA approved Tirzepatide (Mounjaro) for the treatment of Type 2 diabetes.

HISHS-2001 is a novel long-acting, glucose-dependent insulinotropic polypeptide (GIP) and glucagon-like peptide-1 (GLP-1) dual agonist. In in vitro cAMP assays in human GIP/GLP-1 receptor-expressing cells, exerted half-maximal effects at concentrations of 2.3 nM and 4.1 nM on the receptors for GIP and GLP-1 respectively.

HISHS-2001in in vivo comparative efficacy study displayed improved control of glucose homeostasis, body weight, and UCP-1 in diabetic mice as compared with Semaglutide / Tirzepatide and may serve as a promising new dual agonist (GIP / GLP-1R) for T2D and Obesity. Study data details shall be discussed in the conference.

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• Feb. 2022 - Present: Associate Professor, Department of Inorganic and Physical Chemistry, Indian Institute of Science

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• Nov. 2015-Jan. 2016: Assistant Professor, Department of Chemical Sciences, Indian Institute of Science Education and Research Kolkata

• Feb. 2015-Aug. 2015: Postdoctoral fellow at University of Würzburg, Germany with Prof. H. Braunschweig.

• Feb. 2013-Jan. 2015: Alexander von Humboldt (AvH) postdoctoral fellow at University of Würzburg, Germany with Prof. H. Braunschweig.

• Sep. 2012-Jan. 2013: Postdoctoral fellow at University of Würzburg, Germany with Prof. H. Braunschweig.

Academic Qualifications

• July 2007-June 2012: Ph.D. (Chemistry) Indian Institute of Technology Madras, India Thesis Supervisor: Prof. Sundargopal Ghosh, Indian Institute of Technology Madras, India

• June 2005-June 2007: Master of Science (Chemistry), Madurai Kamaraj University, Tamilnadu, India

• June 2002-May 2005: Bachelor of Science, Madurai Kamaraj University, Tamilnadu, India

Fellowships and Awards

• 2020: SERB- Women Excellence Award (Presented by the President of India)

• 2019: NASI-Young Scientist Platinum Jubilee Award.

• 2019: Young Scientist Medal, Indian National Science Academy (INSA).

• 2018: Young Associate, Indian Academy of Sciences.

• 2015: DST Inspire Faculty Award.

• 2013: Alexander von Humboldt postdoctoral fellowship, Germany.

Abstract

Boron Chemistry Lights the Way: Synthetic Utility in Carbon-Boron Bond Formation Reaction

K. Geetharani
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Indian Institute of Science Bangalore

The application of organoborane compounds holds significant importance in the field of chemical, medicinal, and materials science due to their stability and selective transformation into a wide range of functional groups via various available protocols.[1] The most common mode of synthesis of organoboron compounds involves either hydroboration or borylation protocol using metal catalysis as well as a metal-free strategy through the activation of diboron reagents.[2] Despite their versatility, the conventional method for their synthesis involves organometallic reagents, and precious-metal catalyst systems, such as d, Pt, Rh, Re, Ru, and especially Ir, which were developed over the past decades.[3] This put forth the need for the development of catalytic systems based on earth-abundant metals like Mn, Fe, Co, etc. We have developed *N*-heterocyclic carbene-supported cobalt catalysts for the synthesis of a variety of boronic ester derivatives using cheap as well as challenging precursors, such as aryl and alkyl halides,[4,5] substituted alkenes,[6] N-heterocycles,[7] and aldehydes. Another very important development in the field of diboron activation has been achieved in the recent past, where two nucleophilic moieties can coordinate to both boron atoms of the diboron and result in the cleavage of the B-B bond.[8] We have achieved a protocol for homolytic cleavage of B-B bonds of diboron by using simple Diazabutadiene derivatives. The protocol to synthesize trifluoromethyl borylated compounds has also been developed using alkenes as substrates in a single step.

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Roderick Bates received his PhD at Imperial College, London with Professor Steven Ley, using organoiron complexes for organic synthesis. After a postdoctoral stint at Colorado State University with Professor L. S. Hegedus working on chromium carbenes, he moved to the University of North Texas as an Assistant Professor. After some years spent in Thailand at Chulalongkorn University and the Chulabhorn Research Institute and a short stay in the ill-fated Department of Chemistry at Exeter in England, he joined Nanyang Technological University as a pioneer member of the Division of Chemistry and Biological Chemistry.

He is currently an Associate Professor, a Fellow of NTU's Teaching Excellence Academy and the University's Research Integrity Officer. He has research interests in the use of transition metals in organic synthesis, and stereocontrol in natural product synthesis and drug discovery. His book "Organic Synthesis using Transition Metals" (2nd Ed.) was published by Wiley in April 2012. He is also a lecturer on Forensic Science for a Coursera MOOC.

Abstract

From structural biology to organic synthesis: a search for new anti-tuberculosis drugs

Roderick W. Bates
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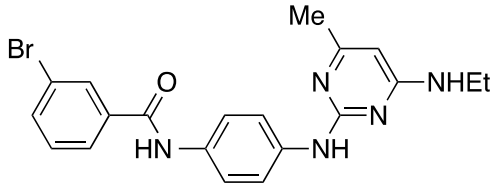
Tuberculosis remains a serious threat to human health, especially in developing countries, and the danger is increasing due to the development of resistance to the few existing drugs. In recognition of this challenge, the Government of India has set a target of eliminating the disease by 2025.

One target in Mycobacterium tuberculosis, the causative organism, is the enzyme ATP synthase. Based upon extensive structural biology knowledge, we have discovered a novel family of ATP synthesis inhibitors. Our efforts have also generated additional lead compounds, although these face the challenge of penetrating the mycobacterium cell membrane. Our preliminary efforts to solve this problem will be presented.



Acknowledgement:

Support from the National Research Foundation of Singapore Competitive Research Programme (CRP), Grant Award Numbers NRF–CRP18–2017–01 and NRF-CRP27-2021-0002 is gratefully acknowledged.

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- B.Sc. (1992-1995): North Maharashtra University, Jalgaon, India

Professional Experience:

- Associate Professor (07/2017-till date): Department of Chemistry, IISER-Bhopal
- Senior Scientist (08/2013-06/2017): CSIR-NCL, Pune
- Senior Scientist (03/2011-08/2013): CSIR-IICT, Hyderabad
- QRS (09/2008-03/2011): CSIR-IICT, Hyderabad
- Research Fellow (01/2008-07/2008): The Scripps Research Institute, USA
- Research Fellow (06/2006-12/2007): Institute of Chemical and Engineering Sciences, Singapore
- Assistant Professor (04/2005-03/2006): Tohoku University, Japan
- JSPS Postdoctoral Fellow (11/2002-03/2005): Tohoku University, Japan
- Postdoctoral Fellow (03/2002-11/2002): University of Goettingen, Germany

Dr. Patil's broad research interests include the development of metal-, organo- and organo/metal-catalyzed enantioselective methods as well as total synthesis of natural products. He has been the recipient of the SERB Distinguished Investigator Award, CRSI Bronze Medal, INSA Young Scientist Medal, Alkyl Amines – ICT Foundation Day Young Scientist Award and Avra Young Scientist Award. He has also served as "Young Associate" of the Indian Academy of Sciences, Bangalore during 2010-2013. Recently, he was elected as a Fellow of the Indian National Science Academy (FNA), a Fellow of The National Academy of Sciences (FNASc), a Fellow of Maharashtra Academy of Sciences (FMASc) and a fellow of The Royal Society of Chemistry (FRSC).

Abstract

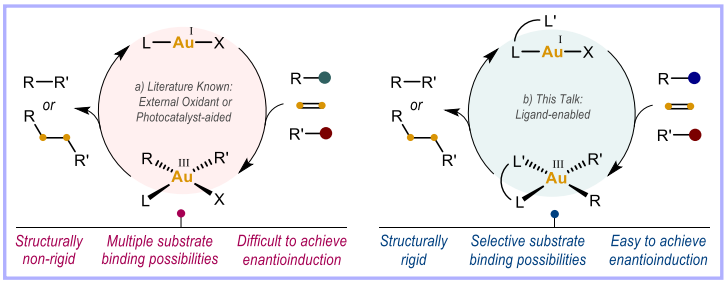
Alkene Functionalizations under Ligand-Enabled Au(I)/Au(III) Redox Catalysis

Nitin T. Patil
Department of Chemistry, Indian Institute of Science Education and Research Bhopal

The past decade has witnessed tremendous advancements in the field of Au(I)/Au(III) redox catalysis. The pioneering work by Zhang and Toste group revealed the role of external oxidants to overcome the high redox potential of Au(I)/Au(III) couple (E^0 = +1.41 V) and to facilitate two-electron redox cycle in gold catalysis (Scheme 1a).[2] Later, the Glorius group introduced the merged gold/photoredox strategy to circumvent the need for a stoichiometric oxidant in these processes.[3] Our group and others introduced ethynylbenziodoxolones (EBXs) for accessing redox gold catalysis which served a dual role as oxidant and alkyne surrogate thereby avoiding the need for external oxidants.[4]

All of the above strategies were not amenable to the use of aryl halides, and thus their use in gold-catalyzed cross-coupling reactions remains forbidden. In recent years, ligand-enabled gold-catalyzed organic reactions have emerged as a valuable tool, allowing for the use of aryl halides as cross-coupling partners. In this talk, I will discuss our most recent work in the area of alkene functionalization employing cross-coupling reactivities.[5,6,7,8,9]

Scheme 1. Concept of Ligand-Enabled Enantioselective Redox Gold Catalysis



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Syngenta & BASF Session

Chairpersons: Srinivas Oruganti & S. V. Ramasastry

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Dr. Srinivas Oruganti is the whole-time Director of Dr. Reddy's Institute of Life Sciences since 2018. He also heads the Center for Process Research & Innovation, an industry-oriented chemistry research department of Dr. Reddy's Institute of Life Sciences. Dr. Oruganti received his Ph.D. in 2004 from the Indian Institute of Science, Bengaluru, in the area of photo switchable cluster glycosides, and did his postdoctoral research at the Centre de Biophysique Moléculaire, CNRS in the design and synthesis of glycocluster–tumor antigenic peptide conjugates for glycotargeting of dendritic cells. He has contributed significantly to various aspects of early stage process development of active pharmaceutical ingredients ranging from therapeutic areas like diabetes, cardio-vascular, multiple sclerosis and cancer. His pivotal contributions pertain to bringing an active pharmaceutical ingredient to market as a generic drug through innovation in chemical process development and offering a strategic vantage point to any pharmaceutical company in its efforts to carve out a niche for itself in ever challenging generic drug market. Recently, with support from Government of Telangana, Dr. Oruganti spearheaded the setting up of a multi-industry centric 'Flow Chemistry Technology Hub (FCT-Hub)' at DRILS to reiterate the commitment to chemical process development withguiding elements of sustainability and circular economy. He is an inventor in more than 100 patents and has published over 40 research papers in leading international journals.

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Department of Chemical Sciences, Indian Institute of Science Education and Research (IISER) Mohali, India
2010 - 2011, Senior Research Scientist
Jubilant Biosys Ltd., Bangalore, India
2008 - 2010, Senior Research Investigator
Bristol-Myers Squibb Biocon Research Center (BBRC), Syngene International Ltd., Bangalore, India
2005 - 2008, Postdoctoral fellow
The Scripps Research Institute, La Jolla, CA, USA (Advisor: Prof. Carlos F. Barbas, III)

Honours and Recognitions:

* Council member of the 'National Organic Symposium Trust (NOST)' for the period 2023-26
* Invited to become the 'Fellow of the Royal Society of Chemistry (FRSC)' under 'Leaders in the Field (LITF)' scheme (2022)
* Recipient of the CDRI Award for Excellence in Drug Research 2022
* Editorial Board member of Organic & Biomolecular Chemistry from February 2022
* Awarded the 'RSC Research Fund' grant 2020
* Swarnajayanti Fellowship (2017-18) awarded by the Department of Science & Technology (DST), Govt. of India
* A. V. Rama Rao Research Foundation (AVRA) Young Scientist Award 2018
* Outstanding Reviewer for Organic & Biomolecular Chemistry in 2018
* Organisation of Pharmaceutical Producers of India (OPPI) Young Scientist award 2018
* Chemical Research Society of India (CRSI) Bronze Medal 2018
* Editorial Advisory Board member of Organic & Biomolecular Chemistry during 2017-2022
* Thieme Chemistry Journals Award 2017
* Young Scientist award from the organizing committee of 'Chemical Frontiers Goa' in 2016
* Admitted as a Member of the Royal Society of Chemistry (MRSC) in 2016
* Skaggs Postdoctoral Fellowship, The Scripps Research Institute, La Jolla, USA [2005-08]
* Awarded JRF and SRF (2001-05) by the CSIR-New Delhi

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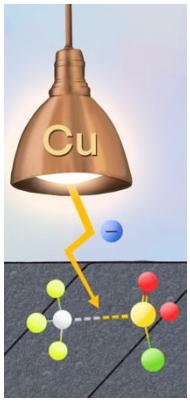
Oliver Reiser studied chemistry at the Universities of Hamburg, Jerusalem, and Los Angeles (UCLA) and obtained his Ph.D. in 1989 with Prof. Dr. Armin de Meijere. He spent 2.5 years as a postdoctoral fellow with Dr. R. Miller, IBM Research Center, San Jose, USA, and with Prof. Dr. D. A. Evans, Harvard University, Cambridge, USA. In 1992 he moved to the University of Göttingen as an Assistant Professor, and in 1996 he moved to the University of Stuttgart as an Associate Professor. Since 1997 he has been a Professor of Organic Chemistry at the University of Regensburg, having served as Vice President and currently as Dean responsible for Research. His group's research interests focus on developing sustainable methodology for converting renewable resources towards value-added compounds.

Abstract

Copper makes the difference: Developing Sustainable Photoredox Catalyzed Transformations

Oliver Reiser
Institut für Organische Chemie, Universität Regensburg, Germany



Synthetic organic chemistry undertakes great efforts to develop new catalytic transformations that utilize greener reagents and avoid stoichiometric additives. In this regard, visible-light photoredox catalysis offers a unique activation mode of molecules, which is serving as an alternative to many thermal transition-metals catalyzed reactions. The vast majority of photoredox-catalyzed processes capitalizes on heavy metals namely, Ru(II) or Ir(III)-complexes which can serve as single electron oxidant or reductant in their photoexcited states. As a low cost-alternative, organic dyes are also frequently used photocatalysts but suffer in general from lower photostability. Copper-based photocatalysts are rapidly emerging, offering not only economic and ecologic advantages, but in addition are able to interact with substrates beyond electron transfer via inner sphere mechanisms, which has been successfully utilized to achieve challenging transformations.

Selected synthetic applications from our laboratory, highlighting the complementary opportunities of copper and iridium-based photocatalysts, will be discussed.

Leading references:

N. Katty, Q-Q. Zhao, T. Mandal, O. Reiser, *ACS Catal.* **2022**, *12*, 14398; A. Reichle, H. Sterzel, P. Kreitmeier, R. Fayad, F. N Castellano, J. Rehbein, O. Reiser, *Chem. Commun.* **2022**, *58*, 4456; A. Chinchole, M. A. Henriquez, D. Cortes-Arriagada, A. R. Cabrera, O. Reiser, *ACS Catal.* **2022**, *12*, 13549; M. Kumar, S. Verma, V. Mishra, O. Reiser, A.K. Verma, *J. Org. Chem.* **2022**, *87*, 6262; Q-Q. Zhao, J. Rehbein, O. Reiser, *Green Chem.* **2022**, *24*, 2772.

Keywords: copper; photoredox catalysis; ATRA reactions; light-induced homolysis; renewable resources

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Prof. Debabrata Maiti received his PhD from Johns Hopkins University in 2008 under the supervision of Prof. Kenneth D. Karlin. After postdoctoral studies at MIT with Prof. Stephen L. Buchwald, he joined the Department of Chemistry at IIT Bombay in 2011. His research interests are focused on the development of new and sustainable synthetic and catalytic methodologies. Currently he is an Associate Editor of Journal of Organic Chemistry.

Abstract

En-Light-ening C-H functionalization

Debabrata Maiti
IIT Bombay

Over years' transition metal-catalyzed C–H activation has propelled the field of organic synthesis for the construction of structurally complex and diverse molecules in resource-economical fashion. In this context, non-directed C–H activation has gained unprecedented attention for attaining region-specific C–H functionalizations in a step-economic mode. Unlike traditional Fujiwara-Moritani reaction, this approach relies on ligand assistance and thus uses arene as the limiting reagent. However, all existing non-directed C–H functionalizations utilize high thermal energy to induce the functional group which eventually put the regioselectivity at stake. In addition, use of super stoichiometric costly silver salts to regenerate the catalyst produces unwanted metal waste. In aid of developing a more sustainable and environmentally benign approach, we have established a photoredox catalytic system by a merger of palladium/organo-photocatalyst(PC) which forges highly regeiospecific C–H olefination of diverse arenes and heteroarenes. Visible light nullifies the requirement of silver salts and thermal energy in executing "region-resolved" Fujiwara-Moritani reaction.

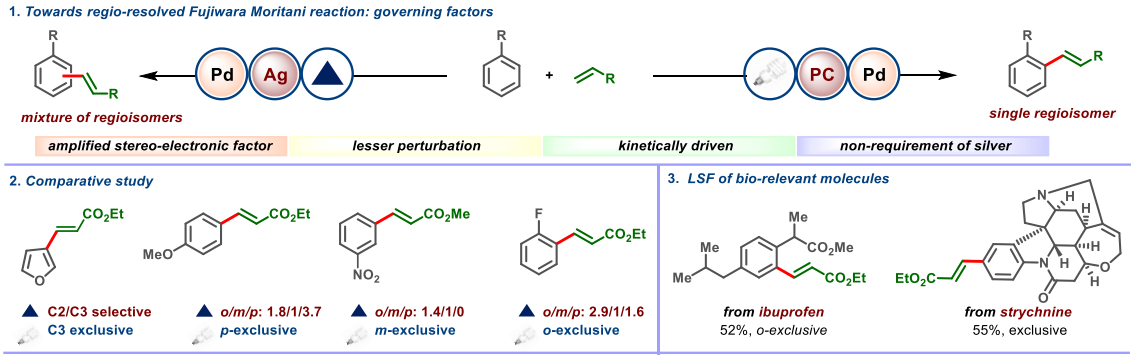

Figure 1. Overview of photoinduced regio-resolved Fujiwara-Moritani reaction

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Alakesh obtained his Ph.D. from IIT Kanpur in Sept. 2006 working with Prof. Vinod K. Singh in the area of development of chiral catalysts for asymmetric synthesis of propargylamines via a direct catalytic A^3-Coupling. Immediately afterward, he moved to the University of California, Berkeley, CA, where he held postdoctoral position with Prof. Richmond Sarpong (Sept. 2006 – Dec. 2009). During his stay at Berkeley, he completed the total synthesis of '*lycopodium alkaloids*' lyconadin A via the discovery of a direct oxidative C-N bond formation, that received considerable attention from the synthetic community.

In Dec. 2009, he left Berkeley and joined Department of Chemistry, IISER Bhopal as an Assistant Professor of Chemistry, later he was promoted to an Associate Professor followed by Professor (Jan., 2018) and continued his Academic journey till May, 2020. Meanwhile, he moved to the Department of Chemical Sciences, IISER Kolkata in May, 2019. The research focus of the AB research group includes the total synthesis of architecturally interesting and biologically active natural products that provide an ideal platform for the invention of new strategies and highly selective organic transformations. His total synthesis has been highlighted in '*Organic Chemistry Portal*' as '*The Bisai Synthesis of (-)-Physovenine*'.

The research of the AB Group has been appreciated in various forms, to name a few:

A. Srikrishna Memorial Lecture (2023, UoH)

CDRI Award (2022, CSIR-CDRI) (Excellence in Drug Research)

'**Special Call**' on 'Reagentless Chemistry' (2022, SERB)

Silver Medal, Chirantan Rasayan Sanstha (2021, VU)

D. Nasipuri Memorial Lecture Award (2021, ICS)

Bronze Medal, Chemical Research Society of India (2021, CRSI)

Fellow, Indian Chemical Society (FICS-2020)

SERB-STAR Award (STAR-2020)

CRSI Young Scientist Award (2018)

DST Young Scientist Research Grant (2013, SERC)

BRNS Young Scientist Award & Grant (2011, DAE)

GRC Award to Postdoc. by Chair, 17th GRC (2008, GRC)

Abstract

Total Syntheses of Architecturally Intriguing Bioactive Natural Products via the Nature-Inspired Oxidative Strategies

Alakesh Bisai
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Nature produces a variety of complex natural products in entioenriched form (see, Figure).1-2 Since these are isolated from Nature in limited quantity (mostly in mg scale), total synthesis endeavors play a crucial role in bioactivity evaluation by providing access to significant quantity.3 This also provides platform for the invention of oxidative strategies for chemical synthesis, such as C-C, C-N, and N-N bond forming reactions.4-5 Since these processes avoid a protection and deprotection groups, the development of methodologies following aerobic oxidations are welcome to synthesize value added organic molecules, particularly for the synthesis of natural products and in pharmaceutical industries.

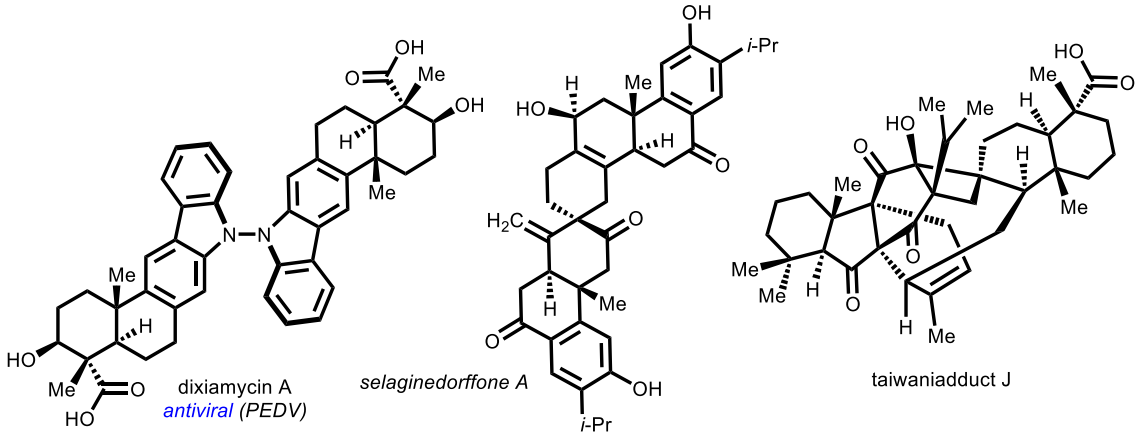

Figure. Architecturally intriguing indole alkaloids of biological relevance.

In the above context, naturally occurring alkaloids with impressive diversity of biological activities drew our interest for the development of strategies to form C-C, C-N, and N-N bonds under oxidative conditions.[1a] Interestingly, a variety of alkaloids of this family show interesting biological activities, such as antibacterial and cytotoxic activities.[1a] Towards this direction, we explored novel oxidative strategies under mild condition that will be discussed in this talk.[6]

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Prof. S. Velmathi received her PhD degree in Organic Chemistry from the University of Madras in the year 2001. After her Ph.D she received Post Doctoral Fellowship from AIST, Japan and worked for three years at National Institute of Advanced Industrial science and Technology, AIST, Tsukuba, Japan. Currently, she is a Professor in the Department of Chemistry (Organic and Polymer Synthesis Laboratory), National Institute of Technology, Trichy. She holds visiting professorship in institutes like National Institute of Materials Science, Japan, Dong A University, Busan, South Korea, National Chiao Tung University, Taiwan and University of Connecticut USA. She is selected for the Tamilnadu Scientist award (**TANSA-2020**), **CRSI** Bronze medal **2023**. Received the prestigious **Tamil Nadu Young Women Scientist Award-2012** for Chemical Sciences. Also selected to receive the **INSA Bilateral Exchange Fellowship-2015**. She is an elected **Fellow of Tamil Nadu Academy of Sciences**. **Fellow of Royal Society of Chemistry (FRSC)**. Her major research areas of interest are organic synthesis, chemo sensors and catalysis. To her credit she has published **170** papers in highly reputed international journals. 3 Japanese patents, 15 papers in conference proceedings, presented papers in 80 International and National conferences. She has delivered invited lectures in many national and international conferences. She has received funding from various funding agencies like DST, DRDO, SERB, CSIR. So far 12 Ph.D, 2 Post Docs and 50 Masters Students have graduated under her guidance and currently 8 scholars are doing their Ph.D degree under her supervision. She is a member of American Chemical Society, Royal Society of Chemistry, and Life member in Chemical Research Society of India (CRSI), Catalysis Society of India (CSI), and Materials Research Society of India (MRSI).

Abstract

Development of Novel Fluorescent probes for Molecular Recognition

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Due to its good selectivity, high reactivity, and capacity for non-invasive detection in both internal and exterior systems, the fluorescence-based sensing approach has received a lot of attention. The scientific and medical communities are particularly interested in the detection of environmental contaminants, pesticides, explosives, and chemical warfare agents (CWAs). There is evidence that victims of chemical, biological, and non-nuclear explosions suffer significant nervous system injury and/or neurobehavioral repercussions. The physical and/or chemical characteristics of CWAs determine how they are exposed. For instance, highly volatile CWAs are likely to be exposed through the respiratory, oronasal, and ocular mucosal tissues while low vapour pressure CWAs are likely to be exposed through skin contact. Our team has recently concentrated on creating innovative probes for the detection of toxic substances like cyanide, hydrazine, peroxinitrite, and warfare chemicals like diethyl chlorophosphate, sulphur mustard, and phosgene. We were aiming to create innovative NIR and ratiometric probes that could demonstrate noticeable selectivity with quick reaction times. Since it has various benefits, including decreased photon scattering, auto-fluorescence, and excitation energy, the development of NIR dyes is one of the research areas that is expanding. Additionally, high-resolution imaging through deep tissue penetration is demonstrated in the 650–900 nm wavelength range. We have also focused on creating new probes for detecting reactive oxygen species like hydrogen peroxide, reactive sulphur species that could be created from H2S when it reacts with enzymes, and biomolecules like bilirubin and cysteine. We have also developed metal nano clusters to be used in sensing application. Our use of the created probes for real-time samples, including environmental samples, biological liquids, and food samples, has demonstrated their practical applicability.

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Dr. Jayanta Haldar is a Professor at the Antimicrobial Research Laboratory in the New Chemistry Unit (NCU) and School of Advanced Materials (SAMat), Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), Bengaluru, India. He joined New Chemistry Unit at JNCASR as an Assistant Professor in 2009, and subsequently became an Associate Professor in 2015. He completed his undergraduate training at the Presidency College, University of Calcutta and he received his Master of Science and PhD from the Indian Institute of Science, Bangalore in 2005. He then pursued his Postdoctoral Research at the Department of Chemistry, Massachusetts Institute of Technology, USA till 2009. He has received several awards and honours such as the Ramanujan Fellowship (Govt. of India), Sheik Saqr Career Award Fellowship, 8th National Award for Technology Innovation from Ministry of Chemicals & Fertilizers (Govt. of India), CDRI Excellence in Drug Research Award in Chemistry, Chemical Research Society of India (CRSI) Bronze Medal, etc. He is a member of editorial boards of various international journals in the field of infectious diseases and medicinal chemistry, such as RSC Medicinal Chemistry, ACS Infectious Diseases, Biomacromolecules, Microbial Pathogenesis, etc.

Prof. Haldar's research integrates an interdisciplinary Medicinal Chemistry and Chemical Biology-based approach for understanding and countering Antimicrobial Resistance (AMR), development of novel therapeutics and newer strategies for tackling infections caused by pathogenic bacteria, fungi and viruses. His laboratory works towards developing smart biomaterials which aid in preventing the spread of infectious diseases, as well as cure infection and enhance wound healing. His multifaceted research has been published in high-impact international journals and has led to many national and international patents. His research has been highlighted in National Science Museums, and media such as BBC News, ACS Chemical Engineering News, Atlas of Science, Scientific American, The Telegraph, etc.

Abstract

Pursuit of next-generation glycopeptides - Our journey with vancomycin

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Vancomycin, a blockbuster antibiotic of the glycopeptide class, has been a life-saving therapeutic against multidrug-resistant Gram-positive infections. The emergence of glycopeptide resistance has however jeopardized public health. The reduced efficacy of vancomycin, and the increased prevalence of vancomycin-resistant pathogens underlines the need to develop credible alternatives with potent activity against vancomycin-resistant bacteria. To address this challenge, our group has been contributing towards the development of semisynthetic vancomycin analogues to tackle vancomycin-resistant bacteria.[1] In this talk, I will be discussing the design and development of multi-target acting next-generation glycopeptides developed by our group. These next-generation derivatives possess additional modes of action such as membrane activity, enhanced binding to target, cell division, etc., and can be achieved by semisynthetic modifications to vancomycin at the carboxy terminal and the amino group of the vancosamine sugar of vancomycin. Our next-generation analogues have demonstrated superior efficacy in tackling vancomycin resistance, in Gram-positive as well as Gram-negative bacteria, including highly drug-resistant strains.[2-7] More importantly, these analogues also possess the ability to tackle various forms non-inherited phenotypic resistance in bacteria, such as metabolically dormant stationary-phase and persister cells, bacterial biofilms, and intracellular pathogens. Our derivatives also display superior pharmacokinetics, and less propensity for resistance development, owing to their different modes of action.[6-7] I will also discuss our very recent studies which explore the additional mechanisms of action of the derivatives through a combination of spectroscopic and microscopic methods.

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Dr Indira Sen is a Team Leader in the Kilo lab at Syngenta Biosciences Pvt. Ltd. After completing her M.Sc Chemistry from IIT Delhi she started her professional journey with Syngenta. She was one of the first employees to complete the company sponsored PhD program in Mangalore university on "Synthesis of new bioactive cyclic sulfonimidamides & oxygen containing fused heterocyclic compounds". She has 15 years of experience in optimization/Lead generation projects in Crop Protection Research in Syngenta. She has led, supervised multiple team of chemists. Dr Indira Sen has co-invented and published more than 32 patents and has 5 research publications.

Educational Qualification:

1. B. Sc. Chemistry (Hons) [2001-2004], Hindu College, Delhi University, New Delhi 74.4% (1st class).
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Professional Experience:

1. Research Scientist, Research Chemistry, Syngenta Biosciences Pvt. Ltd. – 2006-2016
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3. Team Leader, Kilo Lab, Syngenta Biosciences Pvt. Ltd. – May 2021- present
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Publications and Presentations:

Publications in International Journals – 5
Patents - 32

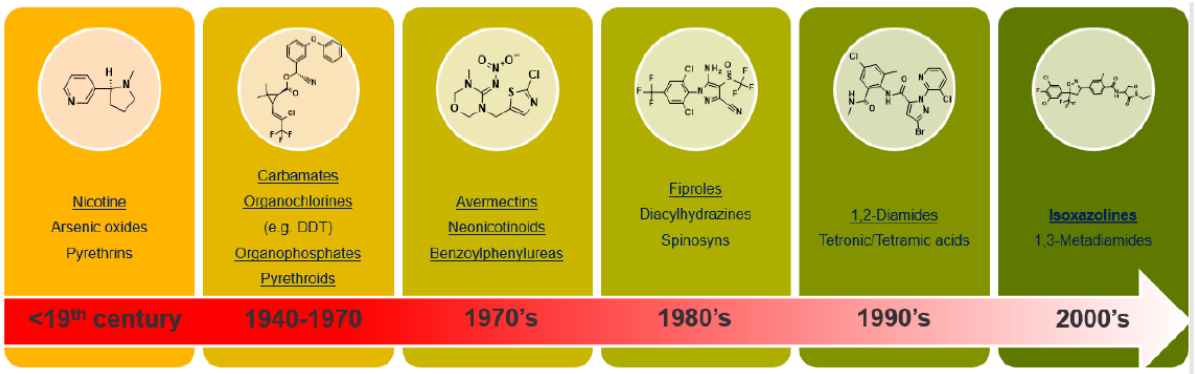
Abstract

The discovery of Isocycloseram: a novel isooxazoline insecticide

Indira Sen
Syngenta Biosciences Pvt Ltd, Santa Monica Works, Goa

Isocycloseram is a novel insecticide discovered at Syngenta Crop Protection. It is a new member of the 97sooxazoline class of insecticides, which acts as a non-competitive antagonist of the invertebrate GABA receptor at a site distinct to that of fiproles and cyclodienes and displays an excellent efficacy and selectivity against invertebrate pests.

Innovative approaches for the delivery of modern agrochemicals such as multi-parameter optimization and faster cycles of Design-Synthesis-Test-Analysis (DSTA) were applied to the discovery of Isocycloseram. This talk will be highlighting the synthesis, optimization and biological efficacy aspects of this new chemical class.



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Dr. Pazhamalai Anbarasan was born (1982) and raised in Cuddalore district, Tamil Nadu, India. After the early education in chemistry from Cuddalore (B. Sc; Periyar Arts College) and Madurai (M. Sc; Madurai Kamaraj University), he obtained his PhD on the enantio-selective synthesis of natural product from Indian Institute of Science, Bangalore with Prof. Kavirayani R. Prasad. Then, he moved to Germany as Alexander von Humboldt fellow to join the group of Prof. Matthias Beller at the Leibniz Institute for Catalysis. In 2010, he joined the group of Prof. Dean Toste at University of California, Berkeley. He joined the Department of Chemistry, Indian Institute of Technology Madras in Dec 2011 and currently he is a Professor of Chemistry.

Abstract

Catalytic Functionalization of Metallocarbenes Derived from Diazo and Non-Diazo Surrogates

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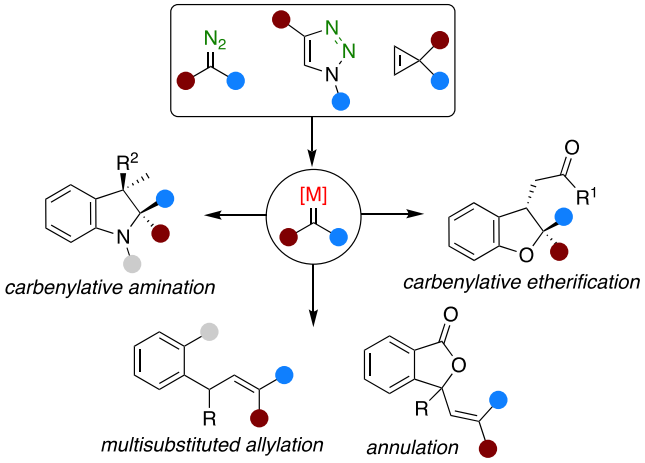
Metallocarbenes show versatile reactivity in organic synthesis and offers access to diverse complex frameworks in single step. Most often these metallocarbenes are generated from *α*-diazocarbonyl compounds in the presence of suitable transition metal.[1] Recently, *N*-sulfonyl-1,2,3-triazoles and cyclopropenes have emerged as unique surrogates and offers structurally different metallocarbenes, which possess distinct reactivity.[2] The unique reactivity of these metallocarbene precursor have been efficiently utilized in our lab for the carbenylative functionalization of *o*-vinylaniline/phenol derivatives, multisubstituted allylation of arenes and annulation reactions.[3] In addition, we are also studying their asymmetric approach with suitable chiral catalyst. In this presentation, our efforts on the catalytic functionalization of metallocarbenes and their asymmetric version will be discussed.



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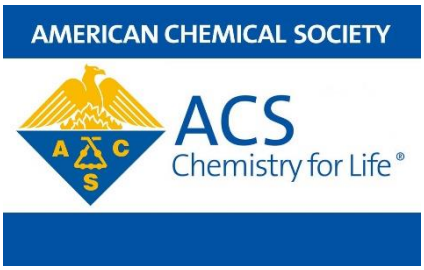
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