

## Dr. G. SEKAR

Professor  
Department of Chemistry  
Indian Institute of Technology Madras  
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### PROF. SEKAR'S RESEARCH OUTCOME (as on May 2019)

- Number of papers published: 116
- Number of Ph.D. students (completed): 22
- Number of Ph.D. students (presently guiding): 08
- Number of sponsored projects (completed): 09
- Number of sponsored projects (on-going): 02
- Invited/guest lecture delivered: 85
- H-index : 32 ; Total citation: 2976 (as on 26th May, 2019) (Source: Scopus; Scopus ID: 6602184820)

### EDUCATIONAL PROFILE

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|----------------------------|--|---------|
| 1. B. Sc. (Chemistry)      | University of Madras, India                  | 1990-93 |
| 2. M. Sc. (Org. Chemistry) | University of Madras (Guindy campus), India  | 1993-95 |
| 3. Ph.D. (Org. Chemistry)  | Indian Institute of Technology Kanpur, India | 1995-99 |

### DOCTORAL DETAILS

*Title of Thesis:* Studies on Allylic Oxidation of Olefins and Cleavage of Epoxides and Aziridines with Amines: Extension to Asymmetric Synthesis.

*Thesis supervisor:* Padma Shri, Prof. Vinod K. Singh, IIT Kanpur, India

### PROFESSIONAL POSITION HELD (IIT Madras)

Professor, Department of Chemistry, IIT Madras (July 2014 – till date)  
Associate Professor, Department of Chemistry (May 2010 – July 2014)  
Assistant Professor, Department of Chemistry (Dec. 2004 – May 2010)

### POSTDOCTORAL EXPERIENCE

1. Postdoctoral scholar in organic chemistry at California Institute of Technology, USA with Prof. Brian M. Stoltz (Feb. 2003 – Dec. 2004)
2. Humboldt (AvH) postdoctoral fellow at University of Goettingen, Germany with Prof. L. F. Tietze (Jul. 2001 – Dec. 2002)
3. JSPS postdoctoral fellow at Toyohashi University of Technology, Japan with Prof. H. Nishiyama (Apr. 2000 – Jun. 2001)
4. Research associate at IIT Kanpur, India with Prof. V. K. Singh (Sep. 1999- Mar. 2000).

## RESEARCH INTERESTS

- Organic Synthesis
- Metal Nanocatalysis
- Halogen Bonding Catalysis

## PROFESSIONAL RECOGNITION, AWARDS, FELLOWSHIPS ETC.

- Our recent research regarding conversion of toluene to benzoic acid using Pt-BNP nano-catalyst in water (in *Applied Catalysis B: Environmental*, **2019**, 250, 325 journal) is highlighted in "**The Hindu**" national English newspaper on 31<sup>st</sup> March, 2019 (Page 13 of Chennai Edition)  
<https://www.thehindu.com/sci-tech/science/iit-madras-converts-petroleum-waste-toluene-into-useful-product/article26688417.ece>
- DD national (Science) TV / RS TV news coverage about conversion of toluene to benzoic acid using our Pt-BNP nano-catalyst in water (18.5.2019, Science Monitor)  
<https://www.youtube.com/watch?v=p04LbtuWfTk>
- Regional Coordinator (Chennai), KVPY (2019)
- National Organic Symposium Trust (NOST) council members (Jan. 2019 – Jan. 2023)
- Fellow of Royal Society of Chemistry (FRSC, 2018)
- Fellow of the Academy of Sciences, Chennai (FASCh., 2018)
- Institute Research & Development Awards (IRDA-2017; Mid-career award) by IIT Madras
- Chemical Research Society of India (CRSI) council members (April 2017 – March 2020)
- Bronze medal for year-2015 by Chemical Research Society of India (CRSI)
- Member, Tamil Nadu's "State Crisis Group" for "management of chemical accidents" (from August, 2013 - till date)
- Editorial board member of "ISRN Organic Chemistry" (Hindawi's open access, peer-reviewed journal) (from Sep. 2010 - 2013)
- AvH Foundation's (Germany) Equipment Grant (2009-10; Euro 19,778)
- Humboldt Postdoctoral Fellowship (AvH), Germany (July 2001 – December 2002)
- SPS Postdoctoral Fellowship, Japan (April 2000 – June 2001)
- DST Fast Track Research Project for Young Scientist (2005-2008, this project was rated as "**Excellent**" by DST expert committee)
- GATE / CSIR research fellowship and CSIR-RA fellowship
- SSLC (school topper); HSC (branch topper); B. Sc. (college topper)

## LIST OF PUBLICATIONS

1. Cu(OTf)<sub>2</sub>-DBN/DBU complex as an efficient catalyst for allylic oxidation of olefins with *tert*-butyl perbenzoate. (G. Sekar, A. DattaGupta and V. K. Singh, *Tetrahedron Lett.* **1996**, 37, 8435).
2. Catalytic enantioselective cyclopropanation of olefins using carbenoid chemistry. (V. K. Singh, A. DattaGupta and G. Sekar, *Synthesis*, **1997**, 137).

3. Asymmetric Kharasch reaction: allylic oxidation of olefins using chiral pyridine bis (diphenyloxazoline)-copper complexes and *tert*-butyl perbenzoate.  
(**G. Sekar**, A. DattaGupta and V. K. Singh, *J. Org. Chem.*, **1998**, *63*, 2961).
4. An efficient method for cleavage of epoxides with aromatic amines.  
(**G. Sekar** and V. K. Singh, *J. Org. Chem.*, **1999**, *64*, 287).
5. An Efficient method for cleavage of aziridines with aromatic amines.  
(**G. Sekar** and V. K. Singh, *J. Org. Chem.*, **1999**, *64*, 2537).
6. Enantiomerically pure  $\beta$ -amino alcohols by enzymatic resolution.  
(**G. Sekar** R. M. Kamble and V. K. Singh *Tetrahedron: Asymmetry*, **1999**, *10*, 3663).
7. An efficient method for the cleavage of aziridines with hydroxyl compounds.  
(B. A. Bhanu Prasad, **G. Sekar** and V. K. Singh *Tetrahedron Lett.* **2000**, *41*, 4677)
8. An efficient method for opening of non-activated aziridines with TMS azide: application in the synthesis of chiral 1, 2-diaminocyclohexane (M. Chandrasekhar, **G. Sekar** and V. K. Singh *Tetrahedron Lett.* **2000**, *41*, 10079)
9. Nonenzymatic kinetic resolution of secondary alcohols: enantioselective S<sub>N</sub>2 displacement of hydroxyl groups by halogens in the presence of chiral BINAP.  
(**G. Sekar** and H. Nishiyama *J. Am. Chem. Soc.* **2001**, *123*, 3603)
10. Nonenzymatic kinetic resolution of  $\beta$ -amino alcohols: chiral BINAP mediated S<sub>N</sub>2 displacement of hydroxy groups by halogens through formation of an aziridinium ion intermediate.  
(**G. Sekar** and H. Nishiyama *Chem. Commun.* **2001**, 1314).
11. Catalyst-Controlled Stereoselective Combinatorial Synthesis  
(L. F. Tietze, N. Rackelmann and **G. Sekar** *Angew. Chem. Int. Ed.* **2002**, *42*, 4254).
12. Highly stereoselective chlorination of  $\beta$ -substituted cyclic alcohols using PPh<sub>3</sub>-NCS: factors that control the stereoselectivity  
(E. A. Jaseer, A. B. Naidu, S. S. Kumar, R. K. Rao, K. G. Thakur and **G. Sekar**, *Chem. Commun.* **2007**, 867)
13. Aerobic, Chemoselective Oxidation of Alcohols to Carbonyl Compounds Catalyzed by DABCO-Copper Complex under Mild Conditions  
(S. Mannam, S. K. Alamsetti and **G. Sekar**, *Adv. Synth. Catal.*, **2007**, *349*, 2253).
14. CuCl catalyzed oxidation of aldehydes to carboxylic acids with aqueous *tert*-butyl hydroperoxide under mild conditions  
(S. Mannam, and **G. Sekar**, *Tetrahedron Lett.* **2008**, *49*, 1083).
15. An efficient BINAM-Copper(II) catalyzed Ullmann-type synthesis of diaryl ether  
(A. B. Naidu, O. R. Rangunath, D. J. C. Prasad and **G. Sekar**, *Tetrahedron Lett.* **2008**, *49*, 1057).

16. CuCl catalyzed selective oxidation of primary alcohols to carboxylic acids with *tert*-butyl hydroperoxide at room temperature  
(S. Mannam, and **G. Sekar**, *Tetrahedron Lett.* **2008**, *49*, 2457).
17. An efficient intermolecular BINAM-copper (I) catalyzed Ullmann type coupling of aryl iodide with aliphatic alcohols  
(A. B. Naidu, and **G. Sekar**, *Tetrahedron Lett.* **2008**, *49*, 3147).
18. Galactose Oxidase Model: Biomimetic, Enantiomer-Differentiating Oxidation of Alcohols by Chiral Copper Complex  
(S. K. Alamsetti, S. Mannam, P. Muthupandi and **G. Sekar**, *Chem. Eur. J.* **2009**, *15*, 1086)
19. An efficient intermolecular C(aryl)-S bond forming reaction catalyzed by BINAM-copper(II) complex  
(D. J. C. Prasad, Ajay B. Naidu and **G. Sekar**, *Tetrahedron Lett.*, **2009**, *50*, 1411)
20. An enantiopure galactose oxidase model: synthesis of chiral amino alcohols through oxidative kinetic resolution catalyzed by chiral copper complex  
(S. Mannam, and **G. Sekar**, *Tetrahedron: Asymmetry* **2009**, *20*, 495)
21. Highly efficient copper catalyzed domino ring opening and Goldberg coupling cyclization for the synthesis of 3, 4-dihydro-2H-1,4-benzoxazines  
(R. K. Rao, A. B. Naidu, and **G. Sekar**, *Org Lett.* **2009**, *11*, 1923)  
**(One of the most accessed top 20 papers in org. Lett. for months of April, 2009)**
22. Chiral cobalt catalyzed enantiomer-differentiating oxidation of racemic benzoin using molecular oxygen as stoichiometric oxidant  
(S. K. Alamsetti, P. Muthupandi and **G. Sekar**, *Chem. Eur. J.* **2009**, *15*, 5424)
23. Chiral iron complex catalyzed enantioselective oxidation of racemic benzoin  
(P. Muthupandi, S. K. Alamsetti and **G. Sekar**, *Chem. Commun.* **2009**, 3288)
24. An efficient copper(I) complex catalyzed Sonogashira type cross-coupling of aryl halides with terminal alkynes  
(K. G. Thakur, E. A. Jaseer, A. B. Naidu and **G. Sekar**, *Tetrahedron Lett.*, **2009**, *50*, 2965)  
**(One of the most accessed top 25 hot Science Direct articles for months of April- June 2009)**
25. An efficient, mild and selective Ullmann-type *N*-arylation of indoles catalyzed by copper(I) complex  
(R. K. Rao, A. B. Naidu, E. A. Jaseer and **G. Sekar**, *Tetrahedron*, **2009**, *65*, 4619)
26. A general, mild and intermolecular Ullmann-type synthesis of diaryl and alkyl aryl ethers catalyzed by diol-copper(I) complex  
(A. B. Naidu, E. A. Jaseer and **G. Sekar**, *J. Org. Chem.* **2009**, *74*, 3675)  
**(One of the most accessed top 10 articles in J. org. Chem. for months of April-June, 2009)**

27. Copper(I) Catalyzed C(aryl)-C(alkynyl) bond formation of aryl iodides with terminal alkynes  
(K. G. Thakur, and G. Sekar, *Synthesis*, **2009**, 2785).
28. An Efficient Copper Catalyzed Synthesis of Hexahydro-1H-phenothiazines  
(D.J.C. Prasad, and G. Sekar, *Org. Biomol. Chem.*, **2009**, 5091).
29. An Efficient, Mild and Intermolecular Ullmann-Type Synthesis of Thioethers Catalyzed by Diol-Copper(I) Complex  
(D.J.C. Prasad, and G. Sekar, *Synthesis*, **2010**, 79).
30. An Efficient Ullmann-type Coupling through C(aryl)-O Bond Forming Intramolecular Cyclization by BINAM Cu(II) Catalyst for the Synthesis of Benzoxazoles  
(A. B. Naidu, and G. Sekar, *Synthesis*, **2010**, 579)
31. An Efficient CuCl Catalyzed Selective and Direct Oxidation of  $\beta$ - and  $\gamma$ -Substituted Aliphatic Primary Alcohols to Carboxylic Acids  
(S. Mannam, and G. Sekar, *Synth. Commun.* **2010**, *40*, 2822).
32. Domino Synthesis of 2-Arylbenzo[b]furans by Copper(II)- Catalyzed Coupling of o-Iodophenols and Aryl Acetylenes  
(E. A. Jaseer, D. J. C. Prasad and G. Sekar, *Tetrahedron*, **2010**, *66*, 2077).
33. Halogenative Kinetic Resolution of  $\beta$ -amido Alcohols: Chiral BINAP Mediated S<sub>N</sub>2 Displacement of Hydroxy Groups by Chlorides with Inversion of Stereochemistry  
(E. A. Jaseer and G. Sekar, *Tetrahedron: Asymmetry*, **2010**, *21*, 780)
34. Halogenative kinetic resolution of  $\beta$ -aryloxy cyclic alcohols: chiral BINAP mediated S<sub>N</sub>2 displacement of hydroxy groups by chlorides with inversion of stereochemistry  
(E. A. Jaseer, I. Karthikeyan and Govindasamy Sekar, *Tetrahedron: Asymmetry*, **2010**, *21*, 2177)
35. Cu(I) Catalyzed Intramolecular C(aryl)-O Bond Forming Cyclization for the Synthesis of 1,4-Benzodioxins and its Application in Total Synthesis of Sweetening Isovanilines  
(Ajay B. Naidu, D. Ganapathy and Govindasamy Sekar, *Synthesis*, **2010**, 3509)
36. An efficient copper(II) catalyzed synthesis of benzothiazoles through intramolecular coupling cyclization of N-(2-chlorophenyl)benzothioamides  
(E. A. Jaseer, D. J. C. Prasad, Arpan Dandapat, G. Sekar, *Tetrahedron Letter*, **2010**, *51*, 5009).
37. Chiral cobalt-catalyzed enantioselective aerobic oxidation of  $\alpha$ -hydroxy esters  
(S. K. Alamsetti and G. Sekar, *Chem. Commun.* **2010**, *46*, 7235)
38. Cu-Catalyzed One-Pot Synthesis of Unsymmetrical Diaryl Thioethers by Coupling of Aryl Halides Using Thiol Precursor  
(D. J. C. Prasad and G. Sekar, *Org. Lett.* **2011**, *13*, 1008).

(This article was highlighted in Organic Chemistry Portal Abstracts)

39. D-Glucosamine as a green ligand for copper catalyzed synthesis of primary aryl amines from aryl halides and ammonia  
(K. G. Thakur and G. Sekar, *Chem. Commun.* **2011**, 47, 5076).
40. D-Glucose as green ligand for selective copper-catalyzed phenol synthesis from aryl halides with an easy catalyst removal  
(K. G. Thakur and G. Sekar, *Chem. Commun.* **2011**, 47, 6692).
41. Chiral Zinc-catalyzed aerobic oxidative kinetic resolution of  $\alpha$ -hydroxy ketones  
(P. Muthupandi and G. Sekar, *Tetrahedron: Asymmetry*, **2011**, 22, 522)
42. An Efficient CuI Catalyzed Synthesis of Diaryl Selenides through C(aryl)-Se Bond Formation using Solvent Acetonitrile as Ligand  
(Arpan Dandapat, C. Korupalli, D. J. C. Prasad, Rahul Singh and G. Sekar, *Synthesis*, **2011**, 2297)
43. Zinc-catalyzed aerobic oxidation of benzoin and its extension to enantioselective oxidation  
(P. Muthupandi and G. Sekar, *Tetrahedron Letters*, **2011**, 52, 692)
44. Copper(I)-BINOL Catalyzed Domino Synthesis of 1,4-Benzoxathiones through C(aryl)-O Bond Formation (Invited Paper)  
(C. Korupalli, A. Dandapat, D. J. C. Prasad and G. Sekar, *Organic Chem. Int.*, **2011**, Volume 2011 (2011), Article ID 980765, 7 pages (doi:10.1155/2011/980765) ) (Invited Article)
45. Synthesis of Optically Active 1,4-Benzoxazine Derivatives using Palladium-Catalyzed Coupling Kinetic Resolution  
(R. Koteswar Rao and G. Sekar, *Tetrahedron: Asymmetry*, **2011**, 22, 948)
46. D-Glucosamine as an efficient ligand for copper catalyzed selective synthesis of aniline from aryl halides and  $\text{NaN}_3$ .  
(K. G. Thakur, K. S. Srinivas, K. Chiranjeevi and G. Sekar, *Green Chem.* **2011**, 13, 2326)
47. Synthesis of unusual dinuclear chiral iron complex and its application in asymmetric hydrophosphorylation of aldehydes  
(P. Muthupandi and G. Sekar, *Org. Biomol. Chem.*, **2012**, 534)  
Our artwork related to this article is featured [in inside front cover of Organic & Biomolecular Chemistry \(Issue 28\)](#)
48. An efficient synthesis of  $\alpha$ -hydroxy phosphonates and 2-nitroalkanols using  $\text{Ba}(\text{OH})_2$  as catalyst  
(P. Muthupandi, Prem K. Chanani, and G. Sekar, *Applied Catalysis A: General*, **2012**, 441-442, 119)
49. Domino aziridine ring opening and Buchwald-Hartwig type coupling-cyclization by Palladium Catalyst.  
(R. Koteswar Rao, I. Karthikeyan, G. Sekar, *Tetrahedron*, **2012**, 68, 9090)

50. Cu-catalyzed in situ generation of thiol using xanthate as a thiol surrogate for the one-pot synthesis of benzothiazoles and benzothiophenes  
(D. J. C. Prasad and G. Sekar, *Org. Biomol. Chem.*, **2013**, *11*, 1659).
51. Palladium nanoparticles stabilized by metal-carbon covalent bond: an efficient and reusable nanocatalyst in cross-coupling reactions  
(D. Ganapathy, and G. Sekar, *Cat. Commun.* **2013**, *39*, 50).
52. Enantioselective Oxidative Coupling of 2-Naphthol Derivatives by Cu-BINAM-TEMPO Catalyst  
(G. Sekar, S. K. Alamsetti, E. Poonguzhali and D. Ganapathy, *Adv. Synthe. Cat.* **2013**, *355*, 2803)
53. Iron(II) Chloride–1,1'-Binaphthyl-2,2'-diamine (FeCl<sub>2</sub>–BINAM) Complex Catalyzed Domino Synthesis of Bisindolylmethanes from Indoles and Primary Alcohols  
(S. Badigenchala, D. Ganapathy, A. Das, R. Singh, G. Sekar, *Synthesis*, **2014**, 101)
54. Isolation and Characterization of Trinuclear Cobalt Complex Containing Trigonal Prismatic Cobalt in Secondary Alcohol Aerobic Oxidation  
(I. Karthikeyan, S. K. Alamsetti and G. Sekar, *Organometallics*. **2014**, *33*, 1665)
55. Chemoselective reduction of  $\alpha$ -keto amides using nickel catalysts  
(N. Chary Mamillapalli and G. Sekar, *Chem. Commun.* **2014**, *50*, 7881)
56. Iron-TEMPO Catalyzed Domino Aerobic Alcohol Oxidation/Oxidative Cross-Dehydrogenative Coupling for the Synthesis of  $\alpha$ -Ketoamides  
(Surya Srinivas Kotha, S. Chandrasekar, Samrat Sahu and G. Sekar, *Eur. J. Org. Chem.*, **2014**, 7415)
57. An efficient route to synthesize isatins by metal-free, iodine-catalyzed sequential C(sp<sup>3</sup>)–H oxidation and intramolecular C–N bond formation of 2'-aminoacetophenones  
(Rajesh Kumar, S. Chandrasekar and G. Sekar, *Org. Biomol. Chem.*, **2014**, *12*, 8512)
58. Iron Catalyzed C–H Bond Functionalization for the Exclusive Synthesis of Pyrido[1,2-*a*]indoles or Triarylmethanols (I. Karthikeyan and G. Sekar, *Eur. J. Org. Chem.* **2014**, 8055)
59. Metal free chemoselective reduction of  $\alpha$ -keto amides using TBAF catalyst (N. C. Mamillapalli and G. Sekar, *RSC Advances*, **2014**, *4*, 61077)
60. An Efficient Synthesis of Polysubstituted Olefins Using Stable Palladium Nanocatalyst: Applications in Synthesis of Tamoxifen and iso-Combretastatin A4  
(D. Ganapathy and G. Sekar, *Org. Lett.* **2014**, *16*, 3856)
61. Stable Palladium Nanoparticles Catalyzed Synthesis of Benzonitriles Using K<sub>4</sub>[Fe(CN)<sub>6</sub>] (D. Ganapathy, Surya S. Kotha and G. Sekar, *Tet. Lett.* **2015**, *56*, 175)
62. Copper-Catalyzed One-Pot Synthesis of  $\alpha$ -Ketoamides from 1-Arylethanol  
(Nidhi Sharma, Nabajit Lahiri, K. Surya Srinivas and G. Sekar, *Synthesis*, **2015**, *47*, 726)

63. An Efficient Synthesis of Pyrido[1,2-a]indoles through Aza-Nazarov Type Cyclization (I. Karthikeyan, D. Arun Prasath, and G. Sekar, *Chem. Commun.*, **2015**, 51, 1701).
64. A Versatile and One-Pot Strategy to Synthesize  $\alpha$ -Amino Ketones from Benzylic Secondary Alcohols using *N*-Bromosuccinimide (Somraj Guha, V. Rajeshkumar, S. Kotha Surya and G. Sekar, *Org. Lett.*, **2015**, 17, 406)
65. Iron-Catalyzed Direct Synthesis of Amides from methylarenes (Surya Srinivas K., Sindhura B. and G. Sekar, *Adv. Synth. Catal.* **2015**, 357, 1437)
66. Domino Reactions: Concept for efficient Organic Synthesis 2nd Edition (L.F. Tietze, Ed.) Book chapter Title: "Oxidation and Reduction Reactions in Domino Processes (G. Sekar, I. Karthikeyan, D. Ganapathy, Wiley-VCH, Weinheim. **2014**, ISBN 978-3-527-33432-2).
67. Pd-catalyzed direct C2-acylation and C2,C7-diacylation of indoles: pyrimidine as easily removable C-H directing group (G. Kumar, G. Sekar, *RSC Advances*, **2015**, 5, 28292).
68. Metal Free One-Pot Synthesis of  $\alpha$ -Ketoamides from Terminal Alkenes, (Sayan Dutta, S. S. Kotha and G. Sekar, *RSC Advances*, **2015**, 5, 47265).
69. An efficient and metal free synthesis of benzylpyridines using HI through the deoxygenation reaction (S.Chandrasekar, I. Karthikeyan and G. Sekar, *RSC Advances*, **2015**, 5, 58790).
70. Chemoselective Reductive Deoxygenation and Reduction of  $\alpha$ -Keto Amides by using Palladium Catalyst (N. C. Mamillapalli and G. Sekar, *Adv. Synth. Catal.* **2015**, 357, 3273).
71. Metal Free Synthesis of  $\alpha$ -Keto Amides from 2-Oxo Alcohols through Domino Alcohol Oxidation-Oxidative Amidation Reaction (S. S. Kotha and G. Sekar, *Tetrahedron Lett.*, **2015**, 56, 6323).
72. Palladium-Catalyzed Intermolecular Carbene Insertion Prior to Intramolecular Heck Cyclization: Synthesis of 2-Arylidene-3-aryl-1-indanones (D. Arunprasath, P. Muthupandi, and G. Sekar, *Org Lett.*, **2015**, 17, 5448).
73. Enantioselective Synthesis of  $\alpha$ -Hydroxy Amides and  $\beta$ -Amino Alcohols from  $\alpha$ -Keto Amides (N Chary Mamillapalli, and G. Sekar, *Chem. Eur. J.*, **2015**, 21, 18584).
74. Cu-Catalyzed Domino Synthesis of 2-Aryl-thiochromanones through Concomitant C-S Bond Formations Using Xanthate as Sulfur Source (S. Sangeetha, P. Muthupandi and G. Sekar, *Org Lett.*, **2015**, 17, 6006). (**This article was highlighted in Organic Chemistry Portal Abstracts**)
75. Stable and Reusable Binaphthyl-Supported Palladium Catalyst for Aminocarbonylation of Aryl Iodides (Nidhi Sharma and G. Sekar, *Adv. Synth. Catal.* **2016**, 358, 314).
76. Potassium phosphate catalyzed chemoselective reduction of  $\alpha$ -ketoamides: Route to synthesize Passerini adducts and 3-phenyloxindoles (Alagesan Muthukumar, N. Chary Mamillapalli and G. Sekar, *Adv. Synth. Catal.* **2016**, 358, 64).



77. Iodine mediated intramolecular C2-amidative cyclization of indoles: A facile access to indole fused tetracycles (Sindhura B., V. Rajeshkumar and G. Sekar, *Org. Biomol. Chem.*, **2016**, *14*, 2297)
78. Stable and Reusable Platinum Nanocatalyst: An Efficient Chemoselective Reduction of Nitroarenes in Water (Surya Srinivas K., Nidhi Sharma and G. Sekar, *Tetrahedron Lett.*, **2016**, *57*, 1410).
79. An Efficient Synthesis of Iminoquinones by Chemoselective Domino ortho-Hydroxylation/oxidation/imidation Sequence of 2-Aminoaryl Ketones (S. Chandrasekar and G. Sekar, *Org. Biomol. Chem.*, **2016**, *14*, 3053).
80. Iron-catalyzed one-pot N-arylation of NH- sulfoximines with methyl arenes through benzylic C-H bond oxidation (M. Muneeswara, Surya Srinivas. K and G. Sekar, *Synthesis*, **2016**, *48*, 1541).
81. An efficient, stable and reusable palladium nanocatalyst: Chemoselective reduction of aldehydes with molecular hydrogen in water (Surya Srinivas K, Nidhi Sharma and G. Sekar *Adv. Synth. Catal.*, **2016**, *358*, 1694)
82. Palladium Nanoparticles Catalyzed Arylation of NH-Sulfoximines with Aryl Iodides (Nidhi Sharma and G. Sekar *RSC Advances*, **2016**, *6*, 37226).
83. Sulfoximinocarbonylation of aryl halides using heterogeneous Pd/C catalyst (Balasubramanian Devi Bala, Nidhi Sharma and G. Sekar, *RSC Advances*, **2016**, *6*, 97152).
84. Bimetallic Chiral Nanoparticles as Catalysts for Asymmetric Synthesis (Review article) (G. Savitha, Rajib Saha and **G. Sekar**, *Tetrahedron Lett.*, **2016**, *57*, 5168).
85. A Transition-Metal-Free and Base-Mediated Carbene Insertion into S-S and Se-Se Bonds: An Easy Access to Thio- and Selenoacetals (D. Arunprasad and **G. Sekar**, *Adv. Synth. Catal.*, **2017**, *359*, 698).
86. Zinc-Catalyzed Chemoselective Alkylation of  $\alpha$ -Keto Amides with 2-Alkylazaarenes (A. L. Muthukumar and **G. Sekar**, *Org. Biomol. Chem.*, **2017**, *15*, 691).
87. Domino Synthesis of Thiochromenes through Cu-Catalyzed Incorporation of Sulfur using Xanthate Surrogate (P. Muthupandi, N. Sundaravelu and **G. Sekar**, *J. Org. Chem.*, **2017**, *82*, 1936).
88. CBr<sub>4</sub> as a Halogen Bond Donor Catalyst for the Selective Activation of Benzaldehydes to Synthesize  $\alpha,\beta$ -Unsaturated Ketones (Imran Kazi, Somraj Guha and **G. Sekar**, *Org. Lett.*, **2017**, *19*, 1244).  
**(One of the most accessed top 10 papers in Org. Lett. for the month Feb-Mar, 2017)**
89. Palladium-Nanoparticles Catalyzed Oxidative Annulation of Benzamides with Alkynes for the Synthesis of Isoquinolones (Nidhi Sharma, Rajib Saha, Naziya Parveen and **G. Sekar** *Adv. Synth. Catal.* **2017**, *359*, 1947).
90. Synthesis of 2-Acylbenzo[b]thiophenes via Cu-Catalyzed  $\alpha$ -C-H Functionalization of 2-Halochalcones Using Xanthate (S. Sangeetha and **G. Sekar**, *Org. Lett.*, **2017**, *19*, 1670) **(This article was highlighted in Organic Chemistry Portal Abstracts)**

91. A Mild and Chemoselective Hydrosilylation of  $\alpha$ -Keto Amides using Cs<sub>2</sub>CO<sub>3</sub>/PMHS/2-MeTHF System (G. Kumar, A. Muthukumar and G. Sekar, *Eur. J. Org. Chem.*, **2017**, 4883) **Our artwork related to this article is featured front cover of *Eur. J. Org. Chem.* (Issue 33)**
92. NIS Mediated Cross-coupling of C(sp<sup>2</sup>)-H and N-H Bonds: A Transition Metal-free approach towards Indolo[1,2-*a*]quinazolinones (B. Sindhura and G. Sekar, *J. Org. Chem.*, **2017**, 82, 7657) **(One of the most read articles in June-July17)**
93. Role of Lewis Base–Coordinated Halogen(I) Intermediates In Organic Synthesis: The Journey From an Unstable Intermediate to a Versatile Reagent (Invited review article) (Somraj Guha, Imran Kazi, Anuradha Nandy and G. Sekar, *Eur. J. Org. Chem.*, **2017**, 5497) **(One of the most accessed papers in the month of 10/2017; Highlighted in Outstanding Organics). Our artwork related to this article is featured front cover of *Eur. J. Org. Chem.* (Issue 37).**
94. Reusable Palladium Nanoparticles Catalyzed Conjugate Addition of Aryl Iodides to Enones: Route to Reductive Heck Product (Naziya Parveen, Rajib Saha and G. Sekar, *Adv. Synth. Catal.*, **2017**, 359, 3741)
95. Halogen–bonded Iodonium Ion Catalysis: A Route to  $\alpha$ –Hydroxy Ketone via Domino Oxidations of Secondary Alcohol and Aliphatic C–H Bond with High Selectivity and Control (Somraj Guha, Imran Kazi, Pranamita Mukherjee and G. Sekar, *Chem. Commun.*, **2017**, 53, 10942)
96. Stereoselective Construction of  $\alpha$ -Tetralone-Fused Spirooxindoles via Pd-Catalyzed Domino Carbene Migratory Insertion/Conjugate Addition Sequence (D. Arunprasath, B. Devi Bala and G. Sekar, *Org. Lett.*, **2017**, 19, 5280) **(One of the most read articles in Sep-Oct '17).**
97. Copper Catalyzed Base-Controlled Diastereoselective Synthesis of Tetraarylethanes from 2-Benzylpyridines (S. Chandrasekar and G. Sekar, *Synthesis*, **2018**, 50, 1275).
98. Phosphine-Free and Reusable Palladium Nanoparticles-Catalyzed Domino Strategy: Synthesis of Indanone Derivatives (Rajib Saha, D. Arunprasath and G. Sekar, *J. Org. Chem.*, **2018**, 83, 4692). **(One of the most read articles in Aug-Sep'18)**
99. Domino Oxidative Esterification of 2-Oxo Alcohol Using 2-Iodoxybenzoic Acid/I<sub>2</sub>: A Route to Synthesize  $\alpha$ -Ketoester (Sundaravelu Nallappan, Ankush Chakraborty and G. Sekar, *ChemistrySelect* **2018**, 3, 8167).
100. FriedelCrafts Hydroxyalkylation of Indoles with Keto Amides using Reusable K<sub>3</sub>PO<sub>4</sub>/nBu<sub>4</sub>NBr Catalytic System in Water (A. Muthukumar and G. Sekar, *J. Org. Chem.*, **2018**, 83,, 8827). **(One of the most read articles in Aug-Sep'18)**
101. Recent developments in functionalization of acyclic  $\alpha$ -keto amides (A. Muthukumar, S. Sangeetha and G. Sekar

*Org. Biomol. Chem.*, **2018**, *16*, 7068). Our artwork related to this article is featured [in inside front cover of Organic & Biomolecular Chemistry \(Issue 39\)](#)

102. Metal-Free Halogen(I) Catalysts for the Oxidation of Aryl(heteroaryl)methanes to Ketones or Esters: Selectivity Control by Halogen Bonding (Somraj Guha and G. Sekar, *Chem. Eur. J.* **2018**, *24*, 14171).
103. Stable Pd-Nanoparticles Catalyzed Domino C-H Activation/C-N Bond Formation Strategy: An Access to Phenanthridinones (Rajib Saha and G. Sekar, *J. Catalysis*, **2018**, *366*, 176).
104. Dual Role of N-Bromosuccinimide as Oxidant and Succinimide Surrogate in Domino One-Pot Oxidative Amination of Benzyl Alcohols for the Synthesis of  $\alpha$ -Imido Ketones (M. Muneeswara, A. Muthukumar, G. Sekar, *ChemistrySelect*, **2018**, *3*, 12524).
105. Dictating the Reactivity of  $\eta^3$ -Oxoallyl Pd-Intermediate toward 5- exo-trig Cyclization: Access to Indano-spirooxindoles (D. Arunprasath, B. Devi Bala, G. Sekar, *J. Org. Chem.*, **2018**, *83*, 11298).
106. Copper-Catalyzed One-Pot Synthesis of 2-Arylthiochromenones: An in Situ Recycle of Waste Byproduct as Useful Reagent (S. Sangeetha, and G. Sekar, *Org. Lett.*, **2019**, *21*, 75).
107. Reusable Palladium Nanoparticles Catalyzed Oxime Ether Directed Mono Ortho-Hydroxylation under Phosphine Free Neutral Condition (R. Saha, N. Perveen, N. Nihesh, and G. Sekar, *Adv. Synth. Catal.*, **2019**, *361*, 510).
108. Copper(II)-Catalyzed Domino Synthesis of Indolo[3,2- c]quinolinones via Selective Carbonyl Migration (D. Arunprasath, and G. Sekar, *Org. Lett.*, **2019**, *21*, 867).
109. Luxury of N-Tosylhydrazones in Transition-Metal-Free Transformations (D. Arunprasath, B. Devi Bala and G. Sekar, *Adv. Synth. Catal.*, **2019**, In Press; DOI 10.1002/adsc.201801031) (Review Article)
110. Selective Oxidation of Alkylarenes to Aromatic Acids/Ketone in Water by Using Reusable Binaphthyl Stabilized Pt Nanoparticles (Pt-BNP) as Catalyst (Rajib Saha and G. Sekar, *Applied Catalysis B: Environmental*, **2019**, *250*, 325 (doi.org/10.1016/j.apcatb.2019.03.052).
- (This research work is highlighted in “The Hindu” national English newspaper on 31<sup>st</sup> March, 2019 (Page 13 of Chennai Edition)**  
<https://www.thehindu.com/sci-tech/science/iit-madras-converts-petroleum-waste-toluene-into-useful-product/article26688417.ece>
111. Zn(OTf)<sub>2</sub>-catalyzed access to symmetrical and unsymmetrical bisindoles from  $\alpha$ -keto amides (A. Muthukumar, G. Narasimha Rao and G. Sekar, *Org. Biomol. Chem.*, **2019**, *17*, 3921).
112. Proton-Coupled Electron Transfer: Transition-Metal-Free Selective Reduction of Chalcones and Alkynes Using Xanthate/Formic Acid (R. Prasanna, Somraj Guha, and G. Sekar, *Org. Lett.*, 2019, In Press, DOI: 10.1021/acs.orglett.9b00635).
113. NBS-mediated synthesis of  $\beta$ -keto sulfones from benzyl alcohols and sodium arenesulfonates (M. Muneeswara and G. Sekar, *Tetrahedron*, **2019** (Just accepted))

114. A covalently linked dimer of [Ag<sub>25</sub>(DMBT)<sub>18</sub>]-, Md Bodiuzzaman, A Nag, R. N. Pradeep, A. Chakraborty, R. Bag, P. Ganesan, G. Natarajan, G. Sekar, S. Ghosh and T. Pradeep, *Chem. Commun.*, **2019** (DOI: 10.1039/C9CC01289C) (just accepted)
115. Synthesis of 1,3-Disubstituted Imidazo[1,5-a]pyridines through Oxidative C-N Bond Formation from Aryl-2-pyridylmethanols and their Fluorescent Study (S. Chandrasekar, S. Sangeetha and G. Sekar, *ChemSelect*, **2019**, (just accepted)
116. Halogen Bond-Assisted Electron-Catalyzed Atom Economic Iodination of Heteroarenes at Room Temperature (I. Kazi, S. Guha and G. Sekar, *J. Org. Chem.* **2019** (just accepted)

### BOOK CHAPTER

Domino Reactions: Concept for efficient Organic Synthesis 2nd Edition, (L.F. Tietze, Ed.), ISBN 978-3-527-33432-2- Wiley-VCH, Weinheim. (Sekar, G.; Karthikeyan, I.; Ganapathy, D.)  
(Chapter Title: "Oxidation and Reduction Reactions in Domino Processes")

### LIST OF Ph. D./M.Sc. STUDENTS

#### **I (A). Ph. D. Completed Under my Guidance**

1. Dr. Sreedevi Mannam (2009)  
(Her Ph. D. thesis was selected for the **Best Thesis in Chemistry Award** for the year 2009 (Prof. C. N. Pillai Prize))
2. Dr. E. A. Jaseer (2010)
3. Dr. Ajay Babu Naidu (2010)  
(His thesis was selected for 2<sup>nd</sup> Prize of "2010 Eli Lilly and Company Asia Outstanding Thesis Awards")  
(His Ph. D. thesis was selected for the **Best Thesis in Chemistry Award** for the year 2011 (Prof. G. Sundararajan Endowment Prize-2011))
4. Dr. R. Koteswar Rao (2011)
5. Dr. Krishna Gopal Thakur (2011)
6. Dr. Santhosh Kumar Alamsetti (2011)  
(His thesis was selected for 1<sup>st</sup> Prize of "2011 Eli Lilly and Company Asia Outstanding Thesis Awards")
7. Dr. P. Muthupandi (2012)  
(His Ph. D. thesis was selected for the **Best Thesis in Chemistry Award** for the year 2013 (Prof. C. N. Pillai Prize))
8. Dr. Jagadeesh Chandra Prasad (2012)  
(His thesis was selected for II<sup>nd</sup> Prize of "2012 Eli Lilly and Company Asia Outstanding Thesis Awards")  
(His Ph. D. thesis was selected for the **Best Thesis in Chemistry Award** for the year 2013 (Prof. C. N. Pillai Prize))
9. Dr. I. Karthikeyan (2014)
10. Dr. D. Ganapathy (2014)  
(His Ph. D. thesis was selected for the **Best Thesis in Chemistry Award** for the year 2014 (Prof. C. N. Pillai Prize))
11. Dr. Surya Srinivas K (2015)
12. Dr. N. Chary Mamillapalli (2016)  
(His Ph. D. thesis was selected for the **Best Thesis in Chemistry Award** for the year 2016 (Prof. C. N. Pillai Prize))
13. Dr. Nidhi Sharma (2016)  
(Her Ph. D. thesis was selected for the G. Sundararajan Endowment Prize for the best thesis)

14. Dr. Somraj Guja (2016)
15. Dr. S. Chandra Sekar (2017)
16. Dr. B. Sindhura (2017)
17. Dr. D. Arun Prasath (2018)
18. Dr. G. Kumar (2018)
19. Dr. Rajib Saha (2018)
20. Dr. A. L. Muthukumar (2018)
21. Dr. M. Muneeswara (2019)
22. Dr. S. Sangeetha (2019)

### **I (B). Current Ph. D. students under my guidance**

1. Mr. Imran Kazi (HTRA)
2. Mr. N. Sundaravelu (CSIR-JRF)
3. Ms. Naziya Parveen (CSIR-JRF)
4. Ms. Gollapalli Narasimha Rao (HTRA)
5. Ms. Anuradha Nandy (HTRA)
6. Mr. Vysakh. V. Nair (HTRA)
7. Ms. Shiyana Rahim (CSIR)
8. Ms. Soundarya Palanisamy (CSIR)
9. Mr. Pandiduri (HTRA)

### **II (a). M. Sc. DISSERTATIONS (Completed Under my Guidance)**

1. Mr. Sanjib Mal (2006)
2. Mr. Abijith Singh (2006)
3. Ms. Nabanita Deb (2007)
4. Mr. Suvankar Dasgupta (2007)
5. Mr. O. R. Raghunath (2008)
6. Mr. Arpan Dandapat (2010)
7. Mr. Chirajeevi Korapalli (2010)
8. Mr. Prem Kumar Chanani (2011)
9. Ms. Ankita Das (2012)
10. Mr. Santhosh Kumar M (2012)
11. Mr. Nabajit Lahiri (2013)
12. Mr. Samrat sahu (2013)
13. Mr. Sayan Dutta (2014)
14. Mr. Bijaideep Dutta (2014)
15. Mr. Ankush Chakraborty (2015)
16. Mr. Sumon Pratihar (2015)
17. Mr. Nihesh Naorem (2016)
18. Ms. Pranamita Mukherjee (2016)

19. Ms. Meghna Ghosh (2017)
20. Mr. Satyadip Paul (2017)
21. Ms. Mousumi Behera (2019)
22. Mr. Rahul Roy (2019)
23. Mr. Kartik Rana (2019)

## **II (b). Current M. Sc. DISSERTATIONS**

1. Mr. Tushar Singh

## **III. POSTDOCTORAL FELLOWS under my guidance (Completed/ current)**

1. Dr. V. Rajesh Kumar (Jan. 2014- March 2015; IITM Institute postdoctoral Scholar /DST-Fast Track young Scientist)
2. Dr. P. Muthupandi (DST Project; Jan. 2014– Jul. 2016)
3. Dr. P. Yuvaraj (UGC-postdoctoral Scholar; Dec. 2015 – March 2016)
4. Dr. B. Devi Bala (SERB-National postdoctoral Scholar; Feb. 2015 – May 2019)
5. Dr. G. Savitha (IITM Woman postdoctoral Scholar /DST-Fast Track young Scientist; Mar. 2015 – Oct. 2017)
6. Dr. P. Prasanna (SERB-National postdoctoral Scholar; Jun. 2016 – Jan. 2019)
7. Dr. E. Poonguzhali (DST-Fast Track young Scientist; July 2016 – July 2017)
8. Dr. Sathis Kannan (SERB-National postdoctoral Scholar; Mar. 2017 – Feb. 2018))
9. Dr. Somraj Guja (IRDS Project; Apr. 2017 – Jan. 2019)
10. Dr. S. Chandra Sekar (RMF Project; Apr. 2017 – Jan. 2018)
11. Dr. B. Sindhura (2017 RMF Project; Apr. 2017 – Jul. 2018)

## **TEACHING EXPERIENCE (in IIT MADRAS)**

### **Ph. D. Courses**

1. CY 734: Modern Concepts in Organic Synthesis

### **M.Sc. Courses**

2. CY6123: Asymmetric Organic Synthesis
3. CY 674/CY6106: Organometallic Chemistry for Organic Synthesis
4. CY 605/CY6013: Synthetic methodology
5. CY 551: Advanced Organic Chemistry of Multiple Bonds
6. CY 505/CY5013: Stereochemistry, Reaction Mechanisms and Aromaticity
7. CY 511: M.Sc. Organic Practicals I
8. CY 562: Organic Chemistry Practicals II

### **B.Tech. Courses**

9. CY 202: Chemistry IV (Industrial Organic Chemistry)
10. CY 102/CY1001: Chemistry II (Organic Chemistry)
11. CY 103/CY1002: B. Tech. Chemistry Laboratory Course

## Preparatory Courses

12. Preparatory Course - Organic Chemistry I
13. Preparatory Course - Organic Chemistry II
14. Preparatory Course – Laboratory Course

## DETAILS OF RESEARCH PROJECTS (Completed/ On-Going)

### 1. IIT Madras funded new faculty scheme (Completed)

Title: Oxidative Kinetic Resolution

Investigator: Dr. G. Sekar, IIT Madras

Duration: 3 years (09-03-2005 to 08-03-2007)

Total fund Allotted: Rs. 5, 00, 000

### 2. DST SERB FAST TRACK Research Project (Completed)

*This project was rated as "Excellent" by DST expert committee.*

Title: Enantioselective Oxidative Kinetic Resolution: Asymmetric Version of Corey-Kim Oxidation and Swern Oxidation

Investigator: Dr. G. Sekar, IIT Madras

Duration: 3 years (22-3-2005 to 21-3-2008)

Total fund Allotted: Rs. 11, 34, 000 (including institute overhead)

### 3. CSIR Sponsored Project (Completed)

Title: Enantioselective Total Synthesis of Gluconeogenesis Inhibitor  
FR225659

Investigator: Dr. G. Sekar, IIT Madras

Duration: 3 years (29.3. 2006 to 28.3. 2009)

Total fund Allotted: Rs. 10,46,000

### 4. DST Sponsored Research Project (Completed)

Title: Enantioselective Total Synthesis of Anti-HIV Michellamines A, B & C and their Unnatural Isomers  
by Asymmetric Ullmann Coupling

Investigator: Dr. G. Sekar, IIT Madras

Duration: 3 years (04.09.2008 – 03.09.2011)

Total fund Allotted: Rs. 39, 90,000 (including institute overhead)

### 5. AvH Foundation, Germany: Under Equipment Grant (completed)

Title: Asymmetric Oxidation and Reduction Reactions:  
Enantioselective Oppenauer Oxidation and MPV Reduction

Investigator: Dr. G. Sekar

Duration: 1 year (19.11.2009 – 18.11.2010)

Total fund Allotted: Euro 19,778

6. CSIR Sponsored Project (completed)

Title: Total Synthesis of Biologically Active Isokotanin-A, Kotanin and Desertorin-C Natural Products through Catalytic, Enantioselective Oxidative Coupling  
Investigator: Dr. G. Sekar, IIT Madras  
Duration: 3 years  
Total fund Allotted: Rs. 23,50,000

7. DST Nano Mission Sponsored Research Project (completed)

Title: Design, Synthesis and Application of New Classes of Easily Recoverable and Reusable Transition Metal Nanocatalysts: An Extension to Asymmetric Synthesis  
Investigator: Dr. G. Sekar, IIT Madras  
Duration: 3 years (30.10.2013-20.10.2016)  
Total fund Allotted: ~Rs. 54,40,000

8. DST Sponsored Research Project (completed)

Title: Iron-Catalyzed C-H Functionalization and C-N Bond Formation through Controlled Carbon and Nitrogen Radicals: Application in Total Synthesis of Biologically Active Compounds  
Investigator: Dr. G. Sekar, IIT Madras  
Duration: 3 years  
Total fund Allotted: Rs. 53,00,000

9. IC&SR, IIT Madras: Exploratory Research Project (completed)

Title: Design, Synthesis and Characterization of New Class of Magnetically Active Core-shell bimetallic Chiral Nanocatalysts for Asymmetric Synthesis  
Investigator: Dr. G. Sekar, IIT Madras  
Duration: 1 year (Mar. 2017 – Feb. 2018)  
Total fund Allotted: Rs. 7,50,000

10. IIT Madras (on-going)

Title: Institute Research and Development Mid-career level Awards, IRDA-2017)  
Investigator: Dr. G. Sekar, IIT Madras  
Duration: 3 years (18.04.2017 – 17.04.2020)  
Total fund Allotted: Rs. 40,00,000

11. DST Sponsored Research Project (on-going)

Title: Design and Synthesis of CBr<sub>4</sub>-Analogues Halogen Bonding Catalysts for Functional Group Activation: An Extension to Asymmetric Synthesis  
Investigator: Dr. G. Sekar, IIT Madras  
Duration: 3 years (12-12-2018 to 11-12-2021)  
Total fund Allotted: Rs. 59,00,000



**DETAILS OF RESEARCH PROJECTS CARRIED OUT UNDER MY GUIDANCE (Completed/ On-Going)**

**12. IIT Madras-Ph.D. students innovative project (Completed)**

Title: Synthesis of highly important optically active alcohols through copper catalyzed Marko oxidation

Student/Postdoctoral scholar: Mr. E.A. Jaseer

Supervisor: Dr. G. Sekar, IIT Madras

Duration: 09-06-2006 to 08-07-2007 (1 year)

Total fund Allotted: Rs. 2,00,000

**13. DST SERB FAST TRACK Research Project (Completed)**

Title: Synthesis, resolution, stereochemistry and computational study. ....

Student/Postdoctoral scholar: Dr. E. Poonguzhali

Supervisor: Dr. G. Sekar, IIT Madras

Duration: 07-07-2009 To 06-01-2013 (3 years)

Total fund Allotted: Rs. 23,22,000

**14. DST SERB FAST TRACK Research Project (Completed)**

Title: Novel copper catalyzed domino oxidative CO-insertion/C-H functionalization: Total synthesis. ....

Student/Postdoctoral scholar: Dr. Rajesh Kumar

Supervisor: Dr. G. Sekar, IIT Madras

Duration: 27-11-2014 To 26-11-2017 (3 years)

Total fund Allotted: Rs. 25,00,000

**15. DST SERB FAST TRACK Research Project (on-going)**

Title: Design and synthesis of new chiral catalysts for enantioselective 1,2-diamine synthesis

Student/Postdoctoral scholar: Dr. G. Savitha

Supervisor: Dr. G. Sekar, IIT Madras

Duration: Sep. 2015 - Aug. 2018 (3 years)

Total fund Allotted: Rs.31,70,000

**16. IIT Madras-Ph.D. students innovative project (completed)**

Title: Enantioselective Intermolecular Carbene Insertion followed by Heck-type Cyclization: Facile Synthesis of 3-Chiral Indanone

Student/Postdoctoral scholar: Mr. D. Arunprasath

Supervisor: Dr. G. Sekar, IIT Madras

Duration: 21-12-2015 to 20.10.-2016(10 months)

Total fund Allotted: Rs. 3,50,000

**17. DST SERB-NPDF (Completed)**

Title: Pd-catalyzed carbonylation/carbene insertion reactions for the synthesis of various N-heterocycles

Student/Postdoctoral scholar: Dr. Devibala

Supervisor: Dr. G. Sekar, IIT Madras

Duration: 17-02-2016 To 16-02-2018

Total fund Allotted: Rs. 19,20,000

**18. DST SERB-NPDF (Completed)**

Title: D-Glucose derived chiral catalyst: Design and synthesis of proline-mimic organocatalyst for asymmetric synthesis

Student/Postdoctoral scholar: Dr. P. Prasanna

Supervisor: Dr. G. Sekar, IIT Madras

Duration: 14-07-2016 To 13-07-2018

Total fund Allotted: Rs. 18,73,000

**INVITED/GUEST LECTURES**

1. Halogen–Bonding Catalysis: An Efficient Tool for Functional Group Activation, 26th April, 2019, Department of Chemistry, BITS Pilani, Rajasthan
2. Halogen–Bonding Catalysis: An Efficient Tool for Functional Group Activation, 24th April, 2019, School of Chemistry, Hyderabad Central University
3. Halogen–Bonding Catalysis: An Efficient Tool for Functional Group Activation, Two – day national seminar 29 & 30th March, 2019, Department of Chemistry, Kakatiya University, Warangal, Telangana
4. Asymmetric Synthesis: Synthesis of Chiral Alcohols, Recent Advances in Chemistry (REC-2019), Keynote lecture, 8th March 2019, PG & Research Dept. of Chemistry, St. Joseph’s College Of Arts & Science (Autonomous), Cuddalore. TN.
5. Halogen–Bonding Catalysis: An Efficient Tool for Functional Group Activation, RAC-19, 4 & 5th January, 2019, Department of Chemistry, Anna University, Chennai.
6. The Halogen–Bonding Catalysis: An Efficient Tool for Functional Group Activation, Guest Lecture, Department of Chemistry, VIT, Vellore, TN, 6<sup>th</sup> Sep. 2018.
7. The Halogen–Bonding Catalysis: An Efficient Tool for Functional Group Activation, Guest Lecture, Department of Chemistry, NIT Trichy, 25th July, 2018
8. The Halogen–Bonding Catalysis: An Efficient Tool for Functional Group Activation, International Conference on Advances in New Materials, (Ican-2018), 8-9, June 2018, Department of Inorganic Chemistry, University of Madras, Chennai
9. The Halogen–Bonding Catalysis: An Efficient Tool for Functional Group Activation, National Seminar on Recent Developments in Chemical Sciences (Rdcs – 2018), 23 & 24th Feb. 2018, Department of Chemistry, IGNTU, Amarkantak, MP
10. Asymmetric Synthesis: Synthesis of Chiral Alcohols by Enantioselective Oxidation and Reduction Chemistry Association Function, 16th Feb. 2018, PG & Research Dept. of Chemistry, Govt. Arts College, Dharmapuri
11. Influence of Chirality in Drug Activity, National level seminar on Modern Trends in Chemical Sciences (MTCS-2018), 15th Feb. 2018, Dept. of Chemistry, Vivekanandha Arts and Science College for Women, Sankari, Salam, Tamil Nadu
12. Synthesis of Chiral Alcohols by Enantioselective Oxidation and Reductio, National Conference on Chemistry Driven Clean Process and Alternate Energies – Scope & Challenges (NCCP 2018), 7th Feb. 2018, Dept. of Chemistry, Hindustan Institute of Technology and Science, Chennai, India

13. Chiral nanocatalysts; 17th orientation program catalysis; Dec. 12, 2017; NCCR, Dept. of Chemistry, IIT Madras.
14. Chiral catalysts; 17th orientation program on catalysis; Dec. 11, 2017; NCCR, Dept. of Chemistry, IIT Madras.
15. Synthesis of Chiral Alcohols by Enantioselective Oxidation and Reduction (Guest lecture), Dec. 6, 2017, Department of Chemistry, Bharathidasan University, Trichy, Tamil Nadu.
16. Synthesis of Chiral Alcohols by Enantioselective Oxidation and Reduction, CHIRAL INDIA-2017, 6th International Conference & Exhibition, Nov. 7-8, 2017, Ramada Plaza, Palm Grove, Juhu, Mumbai
17. Synthesis of Chiral Alcohols by Enantioselective Oxidation and Reduction, Guest lecture at Department of Chemistry, IIT Kharagpur on 27th October, 2017
18. The halogen-bonding catalysis: An efficient tool for functional group activation (poster presentation), RSC-NOST symposium on Organic and Biomolecular Chemistry” on Oct. 3 – 6, 2018 at Leeds, UK
19. Synthesis of Chiral Alcohols by Enantioselective Oxidation and Reduction (Keynote address), International Conference on SOPHISTICATED INSTRUMENTS IN MODERN RESEARCH (ICSIMR – 2017), 30th June & 1st July, 2017, IIT Guwahati.
20. Synthesis of Chiral Alcohols by Enantioselective Oxidation and Reduction, 16th June, 2017, Dept. of Chemistry, BITS Pilani, India
21. Chiral Nanocatalysts for asymmetric synthesis, Summer Training Programme in Chemistry (STPIC-2017), June 2, 2017, School of chemical sciences, University of Madras, Chennai.
22. Asymmetric Synthesis, Summer Training Programme in Chemistry (STPIC-2017), June 2, 2017, School of chemical sciences, University of Madras, Chennai.
23. Synthesis of Chiral Alcohols by Enantioselective Oxidation and Reduction, Guest lecture, May 22, 2017, Dept. of Chemistry, BITS Pilani, Hyderabad Campus, India
24. Synthesis of Chiral Alcohols by Enantioselective Oxidation and Reduction, Guest lecture, May 10, 2017, Dept. of Chemistry, VIT Vellore, TN, India.
25. Synthesis of Chiral Alcohols by Enantioselective Oxidation and Reduction, Guest lecture, May 5, 2017, Dept. of Chemical Sciences, IISER Mohali, India
26. Synthesis of Chiral Alcohols by Enantioselective Oxidation and Reduction, March 24, 2017, Dept. of Chemistry, Central University of Tamilnadu, Thiruvarur, TN, India
27. Synthesis of Chiral Alcohols by Enantioselective Oxidation and Reduction, International Conference on Recent Trends of Chemical & Biological Sciences in Medicine, Natural Product and Drug Discovery (ICRTCBSMNPDD)-2017, March 3-5, 2017, P. G. Dept. of Chemistry, Berhampur University, Odisha, India.
28. Synthesis of Chiral Alcohols by Enantioselective Oxidation and Reduction, UGC sponsored national seminar on Green Chemistry for Environmental Sustainability, February 7, 2017, Bharata Mata College, Thrikkakara, Cochin
29. Catalysts, Lecture-IX, DST-INSPIRE Science Internship Programme for XI students, 2.02.2017, Department of Chemistry, School of Basic Sciences, Vels University, Chennai
30. Metal Nanoparticles Stabilized by Metal-Carbon Covalent Bonds: An Efficient and Reusable Nanocatalyst, Joint IIT Madras – University of Manchester Catalysis Workshop 23rd – 25th January 2017, ICSR Auditorium: Hall I, IIT Madras, Chennai
31. Synthesis of Chiral Alcohols by Enantioselective Oxidation and Reduction, School of Chemistry, Hyderabad Central University, 8th December 2016.
32. Chiral catalysts; 15th orientation program on catalysis; Dec. 2, 2016; NCCR, Dept. of Chemistry, IIT Madras
33. Chiral nanocatalysts; 15th orientation program catalysis; Dec. 2, 2016; NCCR, Dept. of Chemistry, IIT Madras
34. Synthesis of Chiral Alcohols by Enantioselective Oxidation and Reduction, Department of Organic Chemistry IISER Bhopal, 3rd November 2016

35. Synthesis of Chiral Alcohols by Enantioselective Oxidation and Reduction, Department of Organic Chemistry IISc Bangalore, 21st October, 2016
36. Asymmetric Synthesis, Colloquium on Organic and Bioorganic Chemistry: Recent Trends Kottayam, Kerala July 29 -31, 2016
37. Metal Nanoparticles as Efficient and Reusable Nanocatalysts, Colloquium on Organic and Bioorganic Chemistry: Recent Trends Kottayam, Kerala, July 29 -31, 2016
38. Chiral Nano-catalysts, Science City Chennai sponsored Workshop for M.Sc. students, June 30, 2016, School of chemical sciences, University of Madras, Chennai.
39. Asymmetric Synthesis, Science City Chennai sponsored Workshop for M.Sc. students, June 30, 2016, School of chemical sciences, University of Madras, Chennai.
40. Synthesis of Chiral Alcohols Through Enantioselective Oxidation and Reduction, Recent Trends in Organic Chemistry (RTOG-2016), (On the Occasion of Prof. P. Rajakumar's 60th Birthday Celebrations), 10th May, 2016, Department of Organic Chemistry, University of Madras, Chennai.
41. Influence of Chirality in Drug Activity, special lecture (Key-note lecture) at UGC Sponsored one day National Level Seminar on Modern Trends in Chemical Sciences (SMTCS-2016), Dept. of Chemistry, Govt. Arts College, Nandanam, Chennai-35, 29th Jan. 2016.
42. Chiral Nanocatalysts, REFRESHER COURSE IN CHEMISTRY, Academic Staff College, University of Madras October 28, 2015
43. Chiral Catalysts, REFRESHER COURSE IN CHEMISTRY, Academic Staff College, University of Madras October 28, 2015
44. Nature Inspired Chiral Catalysts for Asymmetric Synthesis, National Seminar on Recent Advances in Chemistry August 13, 2015; Kandaswami Kandar's College, Velur, Namakkal, Tamil Nadu.
45. Metal Nanoparticles Stabilized by Metal-Carbon Covalent Bonds: An Efficient and Reusable Nanocatalyst, CiHS-2014, 12th August 2015, Dept. of Chemistry, IIT Madras
46. Metal Nanoparticles Stabilized by Metal-Carbon Covalent Bonds: An Efficient and Reusable Nanocatalyst, CRSI BRONZE medal Lecture; 10th Mid-Year CRSI Symposium in Chemistry JULY 23-25, 2015; Dept. of Chemistry, NIT Trichy, Tamil Nadu, India.
47. Nature Inspired Chiral Catalysts for Asymmetric Synthesis, 16th July, 2015, Department of Chemistry, IIT Hyderabad
48. Chiral Green Catalysts for Asymmetric Synthesis, Key-note lecture at 2nd National Seminar on the Concepts of Green Chemistry (NSCGC'15), Department of Chemistry, SRM-Valliammai Engineering College, Kattankulathur, Chennai.
49. Chiral catalysts; 15th orientation program; Dec. 8, 2014; NCCR, Dept. of Chemistry, IIT Madras
50. Chiral nanocatalysts; 15th orientation program; Dec. 8, 2014; NCCR, Dept. of Chemistry, IIT M
51. Influence of Chirality in Drug Activity, KSCSTE's Colloquium/Seminar on Organic- and Bioorganic-chemistry, July 18-20, 2014, SRIBS, Kottayam, Kerala
52. Nature Inspired Chiral Catalysts for Asymmetric Synthesis; One Day National Seminar on "Catalysis and Catalyzed Reactions" 28th March, 2014, School of Chemistry, MKU, Madurai
53. Nature Inspired Chiral Catalysts for Asymmetric Synthesis, Dept. of Chemistry, IIT Kanpur, March 14, 2014
54. Non-enzymatic Kinetic Resolution; WCRI2K13; December 17-20, 2013; St. Joseph's College, Irinjalakuda, Kerala
55. Nature Inspired Green Catalysts for Asymmetric Synthesis; Industrial Green Chemistry World – 2013 (Green Catalysts); 6, 7, 8 December, 2013; Renaissance Mumbai Convention Centre Hotel, Mumbai, INDIA

56. Advances in Nature Inspired Chiral Catalysts for Asymmetric Synthesis; Chiral India 2013; 14 & 15 November, 2013; Mumbai, INDIA
57. Design, Synthesis and Application of Metal Nanocatalysts Stabilized Covalent Bond; National Symposium on "Frontiers in Organic Chemistry"; (On the Occasion of Prof. M. Periasamy's 60th Birthday Celebrations); School of Chemistry, University of Hyderabad; October 11–12, 2013
58. Chiral Catalysts in Asymmetric Synthesis; Refresher Course in Chemistry; August 28, 2013; UGC-Academic Staff College; University of Hyderabad
59. Chiral Catalysts in Non-enzymatic Kinetic Resolutions; Refresher Course in Chemistry; August 28, 2013; UGC-Academic Staff College; University of Hyderabad
60. Influence of Chirality in Drug Activity, National Seminar on Emerging Trends in Chemistry, March 15, 2013, AVS College of Arts and Science, Salem, Tamil Nadu.
61. Nature Inspired Chiral Catalysts for the Synthesis of Enantiomerically Enriched Activated Alcohols, IFCOS - VIII, April 1 – 3, 2013, Goa
62. Nature Inspired Chiral Catalysts for Asymmetric Synthesis, 1st February, 2013, School of Chemistry, University of Hyderabad
63. Nature Inspired Chiral Catalysts for the Synthesis of Enantiomerically Enriched Activated Alcohols, CHENNAI CHEMISTRY CONFERENCE – 2013
64. Influence of Chirality in Drug Activity, 14th September, 2012, Dept. of Chemistry, Hindustan University, Padur, Chennai.
65. A National Seminar on Recent Trends in Chemistry, CLRI, Chennai, February 8 – 10, 2013.
66. Nature Inspired Chiral Green Catalysts for Aerobic Oxidation of Racemic Alcohols, 2012 TWAS-ROESEAP-GCE Symposium on Frontier in Chemical Engineering, July 27-31, 2012, Beijing, China
67. Nature Inspired Chiral Catalysts for Asymmetric Synthesis, 2nd April, 2012, Dept. of Chemical Sciences, IISER Bhopal
68. Nature Inspired Chiral Catalysts for Asymmetric Synthesis, Current Trends in Chemistry, 16th March, 2012, Department of Chemistry, Pondicherry University
69. Coupling Reactions: From Nobel Success to Modern Trends, Lecture Workshop on "Modern Trends in Chemistry" March 6 & 7, 2012, Department of Chemistry, St. Joseph's College, Irinjalakuda, Kerala, India
70. Synthesis of Enantiomerically Enriched Alcohols by Asymmetric Synthesis, Synthesis of Enantiomerically Enriched Alcohols by Asymmetric Synthesis, Lecture Workshop on "Modern Trends in Chemistry" March 6 & 7, 2012, Department of Chemistry, St. Joseph's College, Irinjalakuda, Kerala, India
71. Nature Inspired Chiral Catalysts for the Synthesis of Enantiomerically Enriched Alcohols, INDIGO – Ph.D Research Conference and Intensive Course, February 12th-16th, 2012, Chennai, INDIA
72. Nature Inspired Chiral Catalysts for the Synthesis of Enantiomerically Enriched Alcohols, 14th CRSI-NSC and 6th CRSI-RSC symposium in Chemistry, February 2nd to 5th, 2012, NIIST & IISER Trivandrum, INDIA
73. Nature Inspired Chiral Catalysts for the Synthesis of Enantiomerically Enriched Alcohols, Frontiers of Chemistry – An Endo-European-Singapore Symposium, November 10-13, 2011, NISER Bhubaneswar
74. Nature Inspired Chiral Catalysts for the Synthesis of Enantiomerically Enriched Alcohols, Horizon-2011, NIT Trichy, 22nd Oct, 2011
75. Modern Trends in Chemistry, Guest Lecturer in Department of Chemistry, Vels University, Chennai, 30th November, 2011.
76. New Chiral Metal Catalysts for Asymmetric Synthesis, Chemistry in-house Symposium-2011, Dept. of Chemistry, IIT Madear, 24th August 2011.

77. Cu-BINAM Complex as an Efficient Catalyst for Organic Synthesis, Dept. of Organic Chemistry, University of Madras, 27th Jan. 2011.
78. Nature Inspired Chiral Catalysts for the Synthesis of Enantiopure Alcohols, NOST – XIV Organic Chemistry Conference – 2010, Goa, Dec. 5-8, 2010
79. Palladium-Catalyzed Cross Coupling in Organic Synthesis, Science Club (115th Meet), IIT Madras, November 13, 2010
80. Galactose Oxidase Enzyme Inspired Chiral Catalysts for the Synthesis of Enantiopure Alcohols, ICBP-2010, IICT Hyderabad, Sep. 21-24, 2010
81. Nature Inspired Chiral Catalysis for Aerobic Oxidative Kinetic Resolution of Racemic Alcohols, NCGSC-2010, BITS Pilani, Feb. 19-21, 2010
82. Nature Inspired Chiral Catalysis for Asymmetric Synthesis, University of Nottingham, UK, September 15, 2009
83. Nature Inspired Chiral Catalysis for Asymmetric Synthesis, Loughborough University, UK, September 14, 2009
84. Nature Inspired Chiral Catalysis for Oxidative Kinetic Resolution of Alcohols, Gregynog Conference, University of Wales, UK, September 11-13, 2009
85. Nature Inspired Chiral Catalysis for Asymmetric Synthesis, BITS Pilani, April 25, 2009

## RESEARCH HIGHLIGHTS

- H-index : **32**; Total citation: **2976** (as on 29 May, 2019); Source: Scopus; Scopus ID: 6602184820)
- Our recent research regarding conversion of toluene to benzoic acid using Pt-BNP nano-catalyst in water (in *Applied Catalysis B: Environmental*, **2019**, 250, 325 journal) is highlighted in “**The Hindu**” national English newspaper on 31<sup>st</sup> March, 2019 (Page 13 of Chennai Edition)  
<https://www.thehindu.com/sci-tech/science/iit-madras-converts-petroleum-waste-toluene-into-useful-product/article26688417.ece>
- DD national (Science) TV / RS TV news coverage about conversion of toluene to benzoic acid using our Pt-BNP nano-catalyst in water (18.5.2019, Science Monitor)  
<https://www.youtube.com/watch?v=p04LbtuWfTk>
- ACS best Poster Presentation Award for our poster presentation at 24th CRSI-National Symposium in Chemistry (CRSINSC-24) 8-10 February, 2019.
- Best Poster Presentation Award for our poster presentation at 22nd CRSI-National Symposium in Chemistry (CRSINSC-22) 2-4 February, 2018.
- Best Poster Presentation Award for our poster presentation at CCC-2013, CSIR-CLRI, Chennai, February 8-10, 2013; Isolation and Characterization of Trinuclear Cobalt Complex in Secondary Alcohol Aerobic Oxidation Reaction.
- Best Poster Presentation Award for our poster presentation at 14th Chemical Research Society of India National Symposium in Chemistry, February 3-5, 2012, NIIST, Trivandrum, India; Cu-catalyzed in situ generation of thiol and its application in synthesis of aryl thioethers, benzothiazoles and benzothiophenes
- Our recent paper (*Org. Lett.*, **2017**, 19, 1244) is one of the most accessed top 20 articles in *Org Lett.* for Month of Feb-Mar, 2017.
- Our paper (*J. Org. Chem*, 2009, 74, 3675) is one of the most accessed top 10 articles in *J. Org. Chem.* for the Months of April-June 2009.
- Our paper (*Org. Lett.* **2009**, 11, 1923) is one of the most accessed 20 articles in *Org Lett.* for Month of April 2009.

- The same research article has been featured in *Synfacts*, **2009**, 8, 841 (Synthesis of 1,4-Benzoxazines by Domino S<sub>N</sub>2 and Goldberg Coupling).
- Our recent paper (*Chem. Eur. J.* **2009**, 15, 5424) has been featured in *Synfacts*, **2009**, 8, 870 (Oxidative Kinetic Resolution of Racemic Benzoin).
- Our paper (*Tetrahedron Lett.*, **2009**, 50, 2965) is one of the most accessed top 25 hot Science Direct articles for months of April- June 2009
- Twenty three of our research articles have been featured in *ChemInform*
- DABCO-CuCl complex synthesized and used by us for the oxidation of alcohols (S. Mannam, S. K. Alamsetti and **G. Sekar**, *Adv. Synth. Catal.*, **2007**, 349, 2253) is added in ALDRICH catalogue with product no: 703141.