Dr. Selvakumar Sermadurai

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Professional Experience

Assistant Professor (Nov. 2017- present): Department of Chemistry, School of Chemical Sciences, Central University of Haryana, Mahendergarh, Haryana.

Post-Doctoral associate (Nov. 2013- Sept. 2017): Department of Chemistry, Kyoto University, Japan. Research Supervisor: **Professor Keiji Maruoka**

Post-Doctoral associate (Aug. 2009- Sept. 2013): Department of Chemistry, North Dakota State University, USA. Research Supervisor: **Professor Mukund P. Sibi**

Academic Records

Ph.D. (July 2004 – July 2009): Indian Institute of Technology Kanpur, Kanpur, India. Thesis Supervisor: **Professor Vinod K. Singh**

M.Sc. Organic Chemistry (2004): University of Madras, Chennai, India.

B.Sc. Chemistry (2002): Thiru. A. Govindasamy Government Arts College affiliated to University of Madras, Tindivanam, India.

Awards and Fellowship

- Prof. S. Swaminathan endowment lectureship and prizes -**2004**.
- Prof. K. K. Balasubramanian's 60$_{th}$ birth felicitation prize -**2004**.
- Junior Research Fellowship from CSIR, New Delhi, India – **2004-2006**.
- Senior Research Fellowship from CSIR, New Delhi, India – **2006-2009**.
- Qualified Graduate Aptitude Test in Engineering (GATE) – **2004** (Score: 99.18; All India Rank # 27).

- Received certificate of outstanding contribution in reviewing for Tetrahedron Letters from Elsevier-**2016**.
- Early Career Research award from SERB, India- **2018**.

Research Interests

- Development of New Synthetic Methodologies using Hypervalent Iodine Reagents
- Visible Light Photoredox Catalysis
- Asymmetric Catalysis (Transition Metal Catalysis and Organocatalysis)
- Synthesis of Biologically Active Molecules
- Conversion of Biomass to Valuable Chemicals

Project Information

1. University Grant Commission-**FRP Start Up Grant** 2019-2021.
2. Early Career Research award from SERB, **ECR Grant** 2019-2022.

Student Supervision

M.Sc.: 2 (completed) 3 (ongoing)

Ph. D.: 1 (ongoing)

Teaching

- Environmental Chemistry
- Physical Organic Chemistry
- Green and Sustainable Chemistry
- Practical Organic Chemistry

List of Publications (h index = 15); Total citations: 705

1. Asymmetric Synthesis of α-Amino acids by Organocatalytic Biomimetic Transamination. Kang, Q.-K.; **Selvakumar, S**.; Maruoka, K. *Org. Lett.* **2019**, *21*, 2294.
2. The Enantioselective alkylation of *N*-Arylhydrazones derived from α-keto esters and isatin derivatives through asymmetric phase transfer catalysis. Kang, Q.-K.;

Selvakumar, S.; Arumugam, N.; Almansour, A. I.; Kumar, R. S.; Maruoka, K. *Chem. Asian J.* **2018**, *13*, 1780.

3. Valorization of 2,5-Furandicarboxylic acid. Diels-Alder reactions with benzyne. Serum, E. M.; **Selvakumar, S**.; Zimmermann, N.; Sibi, M. P. *Green Chem.,* **2018**, *20*, 1448.
4. Fine chemicals from a biomass-derived dicarboxylic acid: Chiral bisoxazolines and their application in enantioselctive Diels-Alder reactions. **Selvakumar, S**.; Fairweather, A.; Ugrinov, A.; Sibi, M. P. *Heterocycles,* **2018**, *97*, 151.
5. Hypervalent iodine (III) catalyzed radical hydroacylation of chiral alkylidene-malonates with aliphatic aldehydes under photolysis. **Selvakumar, S**.; Kang, Q. -K.; Arumugam, N.; Almansour, A. I.; Kumar, R. S.; Maruoka, K. *Tetrahedron* **2017**, *73*, 5841.
6. Synthesis and characterization of polyurethane networks derived from soybean oil-based cyclic carbonates and bio-derivable diamines. Samanta, S.; **Selvakumar, S**.; Bahr, J.; Wickramaratne, D. S.; Sibi, M. P.; Chisholm, B. J. *ACS Sustainable Chem. Eng.,* **2016**, *4*, 6551.
7. Diastereoselective radical hydroacylation of alkylidenemalonates with aliphatic aldehydes initiated by photolysis of hypervalent iodine(III) reagents. **Selvakumar, S.**; Sakamoto, R.; Maruoka, K. *Chem. Eur. J.* **2016**, *22*, 6552. [Selected as Hot Paper]
8. Efficient generation of perfluoroalkyl radicals from sodium perfluoroalkane-sulfinates and a hypervalent iodine(III) reagent: mild metal-free synthesis of perfluoroalkylated organic molecules. Sakamoto, R.; Kashiwagi, H.; **Selvakumar, S.**; Moteki, S. A.; Maruoka, K. *Org. Biomol. Chem.,* **2016**, *14*, 6417.
9. Organophotocatalysis: Insights into the mechanistic aspects of thiourea-mediated intermolecular [2+2] photocycloadditions. Vallavoju, N.; **Selvakumar, S.;** Pamberton, B. C.; Jockusch, S.; Sibi, M. P.; Sivaguru, J. *Angew. Chem. Int. Ed.* **2016**, *55*, 5446.
10. Efficient photolytic C-H bond fucntionalization of alkylbenzene with hypervalent iodine(III) reagent. Sakamoto, R.; Inada, T.; **Selvakumar, S.**; Moteki, S. A.; Maruoka, K. *Chem. Commun.,* **2016**, *52*, 3758.
11. Structural and solubility parameter correlations of gelation abilities for dihydroxylated derivatives of long-chained naturally occurring fatty acids. Zhang, M.; **Selvakumar, S.**; Zhang, X.; Sibi, M.; Weiss, R. G. *Chem. Eur. J.* **2015**, *21*, 8530.
12. Novel Alkyd-type coating resins produced using cationic polymerization. Kalita, H.; Alam, S.; Kalita, D.; Jayasooriyamu, A.; Fernando, S.; Samanta, S.; Bhar, J.; **Selvakumar, S**.; Sibi, M.; Vold, J.; Ulven, C.; Chisholm, B. J. *J. Coat. Technol. Res.,* **2015**, 633.

13. Evaluating thiourea architecture for intramolecular [2+2]-photocycloaddition of 4-alkenylcoumarins. Vallavoju, N.; **Selvakumar, S.**; Jockusch, S.; Prabhakaran, M. T.; Sibi, M. P.; Sivaguru, J. *Adv. Synth. Catal.*. **2014**, *356*, 2763.
14. Metal-free C-H bond activation of branched aldehydes by hypervalent iodine(III) catalyst under visible-light photolysis: Successful trapping with electron deficient olefins. Moteki, S. A.; Usui, A.; **Selvakumar, S.**; Zhang, T.; Maruoka, K. *Angew. Chem. Int. Ed.* **2014**, *53*, 11060.
15. A practical approach for the oxidation of unactivated C_{sp3} –H bonds with o-Nitro(diacetoxyiodo)benzene as an efficient hypervalent iodine(III)-based oxidizing agent. Moteki, S. A.; **Selvakumar, S.**; Zhang, T.; Usui, A.; Maruoka, K. *A. J. Org. Chem*. **2014**, *3*, 932. [Selected as *VIP* and also featured as *cover article*]
16. Enantioselective organo photocatalysis mediated by atropisomeric thiourea derivatives. Vallavoju, N[#].; **Selvakumar, S**[#].; Jockusch, S.; Sibi, M. P.; Sivaguru, J. *Angew. Chem. Int. Ed.* **2014**, *53*, 5604. (#: Equal contribution). [Highlighted in Synfacts, **2014**, *10*, 756].
17. Thermoset Coatings from Epoxidized Sucrose Soyate and Blocked, Biobased Difunctional Carboxylic Acids. Kovash, C. S.; Pavlacky, E.; **Selvakumar, S.**; Sibi, M. P.; Webster, D. C. *ChemSusChem*., **2014**, *7*, 2289.
18. Novel Bio-Based Poly (vinyl ether)s and Their Application as Alkyd-Type Surface Coatings. Kalita, H.; **Selvakumar, S.**; Jayasooriyamu, A.; Fernando, S.; Samanta, S.; Bhar, J.; Alam, S.; Sibi, M. P.; Vold, J.; Ulven, C.; Chisholm, B. *Green Chem.*, **2014**, *16*, 1974.
19. Polyamides Based on the Renewable Monomer, 1,13-Tridecane Diamine I: Synthesis and Characterization of Nylon 13,T. He, J.; Samanta, S.; **Selvakumar, S.**; Lattimer, J.; Ulven. C.; Sibi, M. P.; Chisholm, B. *Green Materials*, **2013**, *1*, 114.
20. Polyamides Based on the Renewable Monomer, 1,13-Tridecane Diamine II: Synthesis and Characterization of Nylon 13,6. Samanta, S.; He, J.; **Selvakumar, S.**; Lattimer, J.; Ulven. C.; Sibi, M. P.; Chisholm, B. *Polymer*, **2013**, *54*, 1141.
21. 8*H*-Indeno[1,2-*d*]oxazole, 2,2′-methylenebis[3a, 8a-dihydro-, (3a*R*, 3′a*R*, 8a*S*, 8′a*S*)] and 8*H*-Indeno[1,2-*d*]oxazole, 2,2′-methylenebis[3a, 8a-dihydro-, (3a*S*, 3′a*S*, 8a*R*, 8′a*R*)]. **Selvakumar**, **S.;** Moorthy, R.; Ma, G.; Sibi, M. P. *Encyclopedia of Reagents in Organic Synthesis*, April 22, **2013**.
22. Magnesium Bis(trifluoromethylsulfonyl)imide. **Selvakumar**, **S.;** Adachi, S.; Sibi, M. P. *Encyclopedia of Reagents in Organic Synthesis*, Sept. 15, **2011**.
23. Zinc Trifluoromethanesulfonate. Deng, J.; **Selvakumar**, S.; Sibi, M. P. *Encyclopedia of Reagents in Organic Synthesis*, March 15, **2011**.

24. Highly Enantioselective Organocatalytic Sulfa-Michael Addition to a α, β -Unsaturated Ketones. Rana, N. K.; **Selvakumar**, S.; Singh, V. K. *J. Org. Chem*. **2010**, *75*, 2089.
25. Asymmetric Organocatalytic Michael-type Reaction of Phosphorus Ylides to Nitroolefins: Synthesis of γ-nitro-β-aryl-α-methylene Carboxylic Esters. Allu, S.; **Selvakumar**, S.; Singh, V. K. *Tetrahedron Lett*. **2010**, *51*, 446.
26. Enantioselective Henry Reaction Catalyzed by C_2-Symmetric Chiral Diamine-Copper (II) Complex. **Selvakumar**, S.; Sivasankaran, D.; Singh, V. K. *Org. Biomol. Chem*. **2009**, *7*, 3156. [Highlighted in Synfacts, **2009**, *10*, 1124*]*.
27. Lewis acid-mediated Rearrangement of Activated Cyclic Amine: A Facile Synthetic Protocol for the Preparation of Amino Carbonyl Compounds. **Selvakumar**, **S.**; Baktharaman, S.; Singh, V. K. *J. Org. Chem*. **2007**, *72*, 10141.
28. Unprecedented Approach towards 2-Substituted Cyclobutanones. Baktharaman, S.; **Selvakumar, S.;** Singh, V. K. *Org. Lett.* **2006**, *8,* 4335.
29. A Novel Entry to Dispiropyrrolo-bicyclo[2.2.1]heptanes Through Sequential 1,3-Dipolar and Diels-Alder Cycloaddition Reactions. Manian, R. D. R. S.; Jayashankaran, J.; **Selvakumar, S.;** Raghunathan, R. *Tetrahedron Lett*. **2006**, *47*, 829.
30. Asymmetric Synthesis of all the Stereoisomers of Tarchonanthuslactone. Baktharaman, S.; **Selvakumar, S.;** Singh, V. K. *Tetrahedron Lett*. **2005**, *46*, 7527.

Patents

1. Monomers and polymers derived from natural phenols. Chisholm, B. J.; Alam, S.; Kalita, H.; Kalita, D.; Sibi, M. P.; **Selvakumar, S.;** Samanta, S. US patent: US 20160023980, issued Jan 28, 2016.
2. Preparation of novel monomers from biomass. Sibi, M. P.; **Selvakumar, S**.; Zimmerman, N.; Serum, E.; Ma, G.; Moorthy, R.; Kalliokoski, K. PCT. Int. patent: WO 2016022943, issued Aug 17, 2017.

Book Chapters

1. Stoichiometric Auxiliary Ligands for Metals and Main Group Elements: Ligands for Magnesium and Calcium. Adachi, S.; **Selvakumar, S**.; Sibi, M. P. In *Comprehensive Chirality*, Carrerira, E. M.; Yamamoto, H. Eds, **2012**, *3*, 655-690.
2. Synthesis and Characterization of Novel Soybean Oil-Based Polymer and Their Application in Coatings Cured by Autoxidation. Kalita, H.; Alam, S.; Kalita, D.; Chernykh, A.; Tarnavchyk, I.; Bahr, J.; Samanta, S.; Jayasooriyama, A.; Fernando, S.; **Selvakumar, S**.; Popadyuk, A.; Wickramaratne, D. S.; Sibi, M.;

Voronov, A.; Bezbaruah, A.; Chisholm, B. J. *Soy-based Chemicals and Materials, ACS Symposium Series,* Vol. 1178, **2014**, Chapter 16, 371-390.

3. Novel Biobased Polymers for Coating Applications. Kalita, H.; Kalita, D.; Alam, S.; Chernykh, A.; Tarnavchyk, I.; Bahr, J.; Samanta, S.; Jayasooriyama, A.; Fernando, S.; **Selvakumar, S.**; Wickramaratne, D. S.; Sibi, M.; Chisholm, B. J. *In Biobased and Environmental Benign Coatings.* Tiwari, A., Galanis, A., Soucek, M. D. Eds, John Wiley & Sons, Inc., Hoboken, NJ, USA. **2016**, DOI: 10.1002/9781119185055.ch1.

Symposium and Conferences

1. Lewis Acid-Mediated Rearrangement of Activated Cyclic Amines. **Selvakumar S.;** Singh, V. K. 3rd J-National Organic Symposium Trust (J-NOST) Conference (November 15-18, 2007) G.N.D. University Amritsar (Punjab), India.
2. Fine Chemicals from renewable resources: Synthesis of chiral bisoxazolines from FDCA and its application in asymmetric synthesis. Fairweather**, A.; Selvakumar, S.** Sibi, M. P. 241st ACS National Meeting & Exposition, Anaheim, CA, United States, March 27-31, 2011 CHED-854.
3. New chiral thioureas containing fluxional groups. **Selvakumar**, S.; Froehlich, N.; and Mukund P. Sibi. 242nd ACS National Meeting & Exposition, Denver, CO, United States, August 28-September 1, 2011 ORGN-590.
4. Fine Chemicals from Renewable Resources. **S. Selvakumar**, Alisa Fairweather and Mukund P. Sibi. Renewable Materials Summit, Fargo, ND, United States, May 5, 2012.
5. New series of chiral thiourea catalysts and their application in asymmetric transformations. **Selvakumar**, S.; Serum, E.; and Mukund P. Sibi. 245th ACS National Meeting & Exposition, New Orleans, LA, United States, April 7-11, 2013 ORGN-733.
6. Metal-Free C-H bond activation of branched aldehydes by hypervalent iodine(III) catalyst under visible-light photolysis. **Selvakumar, S**.; Moteki, S. A.; Usui, A.; Maruoka, K. 4th International Conference on Hypervalent Iodine Chemistry, Chiba, Japan, July 2-5, 2014.