

Dr. Sivakumar Shanmugam, M. Sc., Ph. D.,

Assistant Professor

School of Chemistry / Organic Chemistry

Madurai Kamaraj University

Madurai-625 021

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Employment

March 24, 2010-Present : **Assistant Professor**, Department of Organic Chemistry, School of Chemistry, Madurai Kamaraj University, Madurai-625 021.

Research/Training/Education

- Oct. 2013-Oct. 2014** : **UGC-Raman Post-Doctoral Fellow** at (i) Division of Translational Imaging, New York State Psychiatric Institute, Columbia University, USA. (Oct. 2013 – July, 2014) & (ii) Department of Pathology, University of Michigan, Ann Arbor, Michigan. USA. (July, 2014 - Oct. 2014).
- May 2010-June 2010** : **Visiting Fellow**: (Chemical Biology), Department of Chemistry, Ben-Gurion University of Negev, Israel.
- May 2008-March 2010** : **Post-Doctoral Fellow**: Chemical Biology Lab at Department of Chemistry, Ben-Gurion University of Negev, Israel.
- June 2002-April 2008** : **Ph.D. (Organic Chemistry)** Department of Chemistry, Pondicherry University, Pondicherry. Guide: **Prof. H. Surya Prakash Rao**
- Dec 2002-June 2003** : **Project Fellow** (Organic Chemistry), Industrial Project, Department of Chemistry, Pondicherry University, Pondicherry. Guide: **Prof. H. Surya Prakash Rao**
- March 2002-Nov. 2002** : **Project Assistant**: (Organic Chemistry), Bio-Organic & Applied Materials, Pvt. Ltd. Bangalore, India.
- 1998- 2000** : M. Sc. (Chemistry) Project, Department of Chemistry, Pondicherry University.

Awards/Honors

- 2013-2014** : Indo-US UGC-Raman Postdoctoral Fellowship.
- 2010** : DST Young Scientist Project (FAST TRACK).
- 2006** : Awarded CSIR-SRF (Senior Research Fellow in Council of Scientific and Industrial Research (CSIR)).
- 2001** : Qualified UGC-CSIR-NET 2001 (Council of Scientific and Industrial Research (CSIR)).
- 2001 & 2003** : Qualified GATE (“Graduate Aptitude Test in Engineering”)

Other Experience and Professional Memberships

- 2019 – Present** : **Life Member, Indian Society for Radiation and Photochemical Sciences (ISRAPS)**
- 2014 - Present** : **Member, American Chemical Society, USA**
- 2011 – Present** : **Life Member, Chemical Research Society of India (CRSI), Bangalore**

Ph. D.s/M. Phil/M. Sc guided /on-going:

S. No.	Name of the Degree	No. of awarded	On going
1	Ph.D.	Awarded: 7	4
2	M.Phil. Project	13	0
3	M.Sc. Project	19	2
4.	Summer Research Fellows from Indian Academy of Sciences, Bangalore	Guided: 8	1 allotted

Major research projects under operation/completed with Dr. S. Sivakumar as Principal Investigator:

S. No.	Title of the Research Project	Agency and Funding	Duration
1	Synthesis and Physico-Chemical studies on Rational Design Highly Active Fluorescent BODIPY Probes and their application to Bio- imaging	Major Research Project from Department of Science and Technology (DST) (Rs.23 lakhs)	2011-2014
2	Synthesis and characterization of novel Fluorescent probe from 2-(5-chloro-4-phenyl- 1H -Pyrrole-3-yl)-3-heteroaryls	Major Research Project (Completed), University Grants Commission (UGC), New Delhi (Rs.11.05 lakhs)	2012-2015
3	One-Pot Synthesis of Novel Indenophenaridine Fluorescent Probes and Their Bio-Chemical Application	Major Research Project from (Ongoing), Science and Engineering Research Board (SERB), New Delhi (Rs. 42.83 lakhs)	2017-2020
4	Molecular Design and Development of Imaging Agents and Inhibitors: A Chemical Biology Approach	One of the PI along with 7 PIs- Joint Major Research Project from RUSA, MHRD, New Delhi (Rs.3.84/-cr)	2020-22

Selected List as Invited Speaker to Prestigious Institutions:

S. No.	Title of invited lecture	Name of the Conference
1	Strategy to Development of Organic Sensor Molecules and Their Applications	International symposium on Main-group Molecules to Materials (MMM-2018), during October, 28 - 31, 2018 at by Department of Inorganic and Physical Chemistry, IISc, Bangalore. India
2	Strategy to Development of Highly Substituted Heterocycles and Their Biological Evaluations”	International conference on “Frontiers in Chemical Sciences 2018 (FICS 2018)’ during December 6 - 8, 2018.at Department of Chemistry, IIT Guwahati, India
3	Selective Sensing of Explosive Nitroaromatic Compounds via Aggregation Induced Emission in Aqueous Media	15th DAE-BRNS Biennial - Trombay Symposium on Radiation & Photochemistry, during January 5 - 9, 2020 at Bhabha Atomic Research Centre (BARC), Mumbai, India
4	Design and Synthesis of Donor-Acceptor (D-A) 2H-Pyranone Fluorophore Derivatives and 2	“International Conference on Recent Advances in Analytical Sciences (RAAS-2020)” during March

	their Photophysical Studies	26-28, 2020 at Department of Chemistry, Indian Institute of Technology (BHU), Varanasi, India (now it's postponed due to Covid-19)
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Selected List of Publications (Dr. S. Sivakumar)

- 1). Synthesis and Catalytic Activities of Metal Shells (monolayer, bilayer and alloy layer) Coated Gold Octahedra Towards Catalytic Reduction of Nitroaromatics
Manickam Sundarapandi, **Sivakumar Shanmugam*** and Ramasamy Ramaraj*
J. Phys. Chem. C, 2019, 123, 21066-21075.
- 2). Catalytic Activities of Mono- and Bimetallic (Gold/Silver) Nanoshell Coated Gold Nanocubes toward Catalytic Reduction of Nitroaromatics
Manickam Sundarapandi, Perumal Viswanathan, **Sivakumar Shanmugam*** and Ramasamy Ramaraj*
Langmuir 2018, 34, 13897-13904.
- 3). Ultrasound-assisted one-pot multicomponent 1,3-dipolar cycloaddition strategy: combinatorial synthesis of spiro-acenaphthylene-S,S-acetal and 2H-pyranone derivatives
Sivakumar Shanmugam* and S. Thimmarayaperumal
New Journal of Chemistry, 2018, 42, 4061-4066.
- 4). Fluorescent β -keto thiolester boron complex: substitution based "turn-off" or "ratiometric" sensor for diamine
S.S. Babu and **Sivakumar Shanmugam***
New Journal of Chemistry, 2018, 42, 3394 -3400.
- 5). One-pot synthesis of boron diketonate complexes: photophysical properties and sensor for picric acid
S.S. Babu and **Sivakumar Shanmugam***
Journal of Materials Chemistry C, 2017, 5, 4788-4796.
- 6). Base Promoted Selective Synthesis of 2H-Pyrones and Tetrahydronaphthalenes via Domino Reactions
Sivakumar Shanmugam* and S. Thimmarayaperumal
ACS Omega 2017, 2, 4900–4910.
- 7). Live Cell Imaging of Bacterial Cells: Pyrenoylpyrrole based Fluorescence Labelling
M.A. Divakar and **Sivakumar Shanmugam***
Chemical Biology and Drug Design, 2017, 90, 554–560).
- 8). Tetraphenylethene-2-Pyrone Conjugate: Aggregation-Induced Emission Study and Explosives Sensor
V. Mahendran, K. Pasumpon, S. Thimmarayaperumal, P. Thilagar and **Sivakumar Shanmugam***
J. Org. Chem., 2016, 81, 3597-3602.
- 9). An efficient five-component synthesis of thioether containing dihydropyrano[2,3c]pyrazoles: a green domino strategy
V. Ramesh, **Sivakumar Shanmugam** and Natarajan Savitha Devi*
New Journal of Chemistry, 2016, 40, 9993-10001.
- 10). α -Aroylidineketene dithioacetal chemistry: CuI catalyzed synthesis of 2-styryl benzimidazoles

enroute to regioselective hydrothiolation
P. Dhanalakshmi, and **Sivakumar Shanmugam***
Tetrahedron, 71 (2015) 6300- 6314.

- 11). Condensation of α -Aroylketene Dithioacetals and 2-Hydroxyarylaldehydes Results in Facile Synthesis of a Combinatorial Library of 3-Aroylcoumarins
H.S.P. Rao and **Sivakumar Shanmugam**
J. Org. Chem., 2006, 71, 8715-8723.
- 12). Nitroketene Acetal Chemistry – 3: Facile Synthesis of Nitroacetic Acid Triarylmethyl Orthoesters from 1,1-Di(methylsulfanyl)-2-nitroethylene
H.S.P. Rao and **Sivakumar Shanmugam**
J. Org. Chem., 2005, 70, 4524-4527.

Conference / Workshops / Seminars, Symposia organized

- 1). **Secretary**, Lecture Workshop on Bioinorganic Chemistry sponsored by Indian academy of Science (IASc), Bangalore, in School of Chemistry, Madurai Kamaraj University, Madurai -625 021, on 28-30 September 2012
2. **Coordinator**, Lecture Workshop on Advances of Chemistry sponsored by Indian Academy of Science (IASc) during July 26-27, 2013 at School of Chemistry, Madurai Kamaraj University, Madurai-625025.
3. **Coordinator**, CRSI National Seminar on “Emerging Trends in Chemistry”, February 18-20, 2016, School of Chemistry, Madurai Kamaraj University, Madurai-625025.
4. **Convener**, Lecture Workshop on Entrepreneurship Skill Development in Chemistry sponsored by National Academy of Sciences India (NASI), Allahabad, March10-11, 2017, School of Chemistry, Madurai Kamaraj University, Madurai -625021.
5. **Coordinator**, RSC Symposium Bioinorganic and Chemical Sciences sponsored by Indian Academics of Sciences (IASc), India during March17-18, 2017, School of Chemistry, Madurai Kamaraj University, Madurai-625021.
- 6 **Convener**, SERB-NPDF Committee Meeting, School of Chemistry, Madurai Kamaraj University, Madurai-625021.

List of Publications (*Corresponding Author)

2019

30. Synthesis and Catalytic Activities of Metal Shells (monolayer, bilayer and alloy layer) Coated Gold Octahedra Towards Catalytic Reduction of Nitroaromatics
Manickam Sundarapandi, **Sivakumar Shanmugam*** and Ramasamy Ramaraj*
J. Phys. Chem. C, 2019, 123, 21066-21075.
29. Catalyst free Synthesis of Highly Functionalized Indolizines from In Situ Generated Pyridinium Ylides *via* One-Pot Multicomponent Reaction
V. Ramesh, **Sivakumar Shanmugam*** and Natarajan Savitha Devi
ChemistrySelect 2019, 4, 3717-3721.

2018

28. Catalytic Activities of Mono- and Bimetallic (Gold/Silver) Nanoshell Coated Gold Nanocubes toward Catalytic Reduction of Nitroaromatics
Manickam Sundarapandi, Perumal Viswanathan, **Sivakumar Shanmugam* and**
Ramasamy Ramaraj*
Langmuir 2018, 34, 13897-13904.
27. Metal-Free γ,δ -Unsaturated β -Ketothiolester: Solvatochromism, AIEE and Detection of Picric Acid
S.S. Babu and **Sivakumar Shanmugam***
ChemistrySelect 2018, 13, 4075-4081.

26. Ultrasound-assisted one-pot multicomponent 1,3-dipolar cycloaddition strategy: Combinatorial synthesis of spiro-acenaphthylene-S,S-acetal and 2H-pyranone derivatives
Sivakumar Shanmugam* and S. Thimmarayaperumal
New Journal of Chemistry, 2018, 42, 4061 – 4066.
25. Fluorescent β -ketothiolester boron complex: substitution based “turn-off” or “ratiometric” sensor for diamine
S.S. Babu and **Sivakumar Shanmugam***
New Journal of Chemistry, 2018, 42, 3394 – 3400.
24. A Simple and Direct Synthesis of Penta substituted Pyrroles via [3+4] Annulation and Their In Vitro Evaluation as Thrombolytic agents and Cytotoxicity Studies on L929 Cells"
Sivakumar Shanmugam* and Biguvu Balachandra,
ChemistrySelect 2018, 3, 2037–2044.
23. Er(OTf)₃-Catalyzed Multicomponent Synthesis of 3,4-Dihydro-2H-pyran via Hetero- Diels-Alder Reaction under Ambient Temperature has been built and requires approval
V. Ramesh, **Sivakumar Shanmugam** and Natarajan Savitha Devi*
ChemistrySelect 2018, 3, 3652–3658.

2017

22. CAN-Supported Chemoselective Oxidative Conversion of α -Aroylketene-(S,S)-acetals to Aryl Carboxylic Acids
S. Sriram Babu and **Sivakumar Shanmugam***
ChemistrySelect, 2017, 2, 2330-2334.
21. Live Cell Imaging of Bacterial Cells: Pyrenoylpyrrole based Fluorescence Labelling
M.A. Divakar and **Sivakumar Shanmugam***
Chemical Biology and Drug Design, 2017, 90, 554–560.
20. An Easy Access to Bipyrazoles and Unusual Demethylation of Methyl Phosphorous Ester: Exploring the Synthetic Utility of Bestmann-Ohira Reagent
Mahendran, K. Pasumpon and **Sivakumar Shanmugam***
ChemistrySelect, 2017, 2, 2866-2869.
19. One-pot synthesis of boron diketonate complexes: photophysical properties and sensor for picric acid
S.S. Babu and **Sivakumar Shanmugam***
Journal of Materials Chemistry C, 2017, 5, 4788-4796.
18. Synthesis of chiral α -carbonyl- δ -nitro-ketenedithioacetals via L-proline catalyzed Michael addition reaction
Arun Divakar Mathiyazhagan and **Sivakumar Shanmugam***
Research on Chemical Intermediates 2017, 43, 6863–6873.
17. Base Promoted Selective Synthesis of 2H-Pyrones and Tetrahydronaphthalenes via Domino Reactions
Sivakumar Shanmugam * and S. Thimmarayaperumal
ACS Omega 2017, 2, 4900–4910.

2016

16. Tetraphenylethene-2-Pyrone Conjugate: Aggregation-Induced Emission Study and Explosives Sensor
V. Mahendran, K. Pasumpon, S. Thimmarayaperumal, P. Thilagar, and **Sivakumar Shanmugam ***
J. Org. Chem., 2016, 81, 3597-3602.
15. An efficient five-component synthesis of thioether containing dihydropyrano[2,3c]pyrazoles: a green domino strategy
V. Ramesh, **Sivakumar Shanmugam** and Natarajan Savitha Devi*
New Journal of Chemistry, 2016, 40, 9993-10001.
14. Regioselective synthesis of pyrrolylpyrazole as a multifunctional compound: Potential antibacterial as well as anticancer agent
A. Divakar Mathiyazhagan and **Sivakumar Shanmugam***
ChemistrySelect, 2016, 1, 6151-6155.

2015

13. Copper(ii) bromide-catalyzed C-C/C-N bond forming reactions: synthesis of pyrrole-incorporated triarylmethane

- H. Surya Prakash Rao, A. Veera Bhadra Rao and **Sivakumar Shanmugam***
Synthetic Communications, 2015, 45, 2712-2717.
12. One-pot chemo/regio/stereoselective generation of a library of functionalized spiro- oxindoles/ pyrrolizines/pyrrolidines from α -aroylidineketene dithioacetals
 Pandi Dhanalakshmi, S.S. Babu, S.i Thimmarayaperumal and **Sivakumar Shanmugam ***
RSC Adv., 2015, 5, 33705-33719.
 11. α -Aroylidineketene dithioacetal chemistry: CuI catalyzed synthesis of 2-styryl benzimidazoles enroute to regioselective hydrothiolation
 P. Dhanalakshmi, and **Sivakumar Shanmugam ***
Tetrahedron 2015, 71, 6300- 6314.
 10. Facile synthesis and characterization of bioorganometallic compounds and their biological activity contour against human pathogens
 M.A. Divakar, V. Sudhamani, **Sivakumar Shanmugam*** T. Muneeswaran, S. T amilzhalagan, M. Ramakritinan and K. Ganesan
RSC Adv., 2015, 5, 8362-8370.
 9. Iodine catalyzed one-pot synthesis of highly substituted N-methyl pyrroles via [3 + 2] annulations and their in vitro evaluation as antibacterial agents
 B. Balachandra, **Sivakumar Shanmugam, *** T. Muneeswaran and M. Ramakritinan
RSC Adv., 2015, 5, 64781-64789.
 8. One-pot synthesis of hydrazono-sulfonamide adducts using Cu(BTC) MOF catalyst and their remarkable AIEE properties: unprecedented copper(II)-catalyzed generation of ketenimine
 Mahendran and **Sivakumar Shanmugam ***
RSC Adv., 2015, 5, 20003-20010.
 7. Aggregates of a hydrazono-sulfonamide adduct as picric acid sensors
 Mahendran and **Sivakumar Shanmugam***
RSC Adv., 2015, 5, 92473-92479.

2014

6. Convenient one-pot multicomponent strategy for the synthesis of 6- pyrrolylpyrimidines,
 Pandi Dhanalakshmi, Solaimalai Thimmarayaperumal and **Sivakumar Shanmugam***.
RSC Adv., 2014, 4, 29493-29501.
5. Metal catalyst free one-pot synthesis of 2-arylbzimidazoles from α - aroylketene dithioacetals
 Pandi Dhanalakshmi and **Sivakumar Shanmugam ***
RSC Adv., 2014, 4, 12028-12036.

2003-2007

4. Aroylketene Dithioacetal Chemistry: Facile Synthesis of 4-Aroyl-3-methylsulfanyl-2- tosylpyrroles from Aroylketene Dithioacetals and TosMIC
 H.S.P. Rao and **S. Sivakumar**
Beilstein J. Org. Chem., 2007, 3:31.
3. Condensation of α -Aroylketene Dithioacetals and 2-Hydroxyarylaldehydes Results in Facile Synthesis of a Combinatorial Library of 3-Aroylcoumarins
 H.S.P. Rao and **Sivakumar Shanmugam**
J. Org. Chem., 2006, 71, 8715-8723.
2. Nitroketene Acetal Chemistry – 3: Facile Synthesis of Nitroacetic Acid Triarylmethyl Orthoesters from 1,1-Di(methylsulfanyl)-2-nitroethylene
 H.S.P. Rao and **Sivakumar Shanmugam**
J. Org. Chem., 2005, 70, 4524-4527.

1. Nitromethylidene]-1,3-dithioles from the Dipotassium Salt of 2-Nitro-1,1-ethylenedithiol
H.S.P. Rao.; Sakthikumar, L.; Vanitha, S.; **Sivakumar Shanmugam**
Tetrahedron Lett. **2003**, 44, 4701-4704.