



SREEJITH SHANKAR P., PhD

Senior Scientist | Assistant Professor (AcSIR)

Room 102, Sir C. V. Raman Block

Photosciences and Photonics Section, Chemical Sciences and Technology Division

CSIR – National Institute for Interdisciplinary Sciences and Technology (CSIR – NIIST)

Industrial Estate P. O., Pappanamcode, Thiruvananthapuram – 695019, Kerala, INDIA

email : sreejith.shankar@niist.res.in

Phone : +91 471 2515 333 (O), +91 94462 84213 (M)

Web : <https://www.shankarlab.com>

<https://www.niist.res.in/english/scientists/sreejith-shankar-p/profile.html>

1. PERSONAL PROFILE

Date of Birth	: 30-03-1984
Permanent Address	: Pooppanal House, Puttumanoor, Puthencruz (P.O) Ernakulam, Kerala – 682308, INDIA. Phone: +91 9446284213 email: sreejith.shan@gmail.com
Nationality	: Indian
Marital Status	: Married
Language Proficiency	: English, Malayalam, Hindi, Tamil, Italian (Basic)

2. EDUCATIONAL QUALIFICATIONS:

- 2011:** PhD in **Industrial Chemistry and Chemical Engineering** from Politecnico di Milano, Milan, Italy. (*con merito, with distinction*)
Advisor: Prof. Matteo Zanda.
Title of the thesis: Development of Tubulysin Analogs: Peptidomimetics Targeting Cancer and Angiogenesis through Immunoconjugates.
- 2007:** MSc (**Organic Chemistry**) from Mahatma Gandhi University, Kottayam, India (8.87/10 (GPA), *First Rank*)
Advisor: Dr. T. K. Chakraborty (IICT, Hyderabad).
Title of the thesis: Design and Development of Peptides and Peptidomimetic compounds – Synthesis of Homooligomers of Unusual δ -Amino Acids Derived from D-Glucose
- 2005:** BSc (**Chemistry**) from Mahatma Gandhi University, Kottayam, India (95.8%, **Distinction**)

3. RESEARCH POSITIONS

July 2021-Till Date : **Senior Scientist and Assistant Professor (AcSIR)**
Chemical Sciences and Technology Division
CSIR – National Institute for Interdisciplinary Sciences and Technology (CSIR – NIIST), Thiruvananthapuram, India

- June 2017-July 2021 :** **Ramanujan Fellow and Assistant Professor, AcSIR**
Chemical Sciences and Technology Division
CSIR – National Institute for Interdisciplinary Sciences and Technology
(**CSIR – NIIST**), Thiruvananthapuram, India
- Nov. 2016-June 2017:** **DST – INSPIRE Faculty**
Chemical Sciences and Technology Division
CSIR – National Institute for Interdisciplinary Sciences and Technology
(**CSIR – NIIST**), Thiruvananthapuram, India
- Sept. 2015-Oct. 2016 :** **Humboldt Research Fellow**
Otto Diels Institute for Organic Chemistry
University of Kiel, Germany (Advisor: Prof. R. Herges)
- June -August 2015 :** **SFB 677 Postdoctoral Fellow**
Otto Diels Institute for Organic Chemistry
University of Kiel, Germany (Advisor: Prof. R. Herges)
- June 2014-Mar 2015:** **Academic Intern** (Non-tenure Track)
Department of Organic Chemistry
Weizmann Institute of Science, Israel (Advisor: Prof. M. van der Boom)
- June 2011-June 2014:** **Visiting Scientist; Marie Curie Early Stage Researcher**
Department of Organic Chemistry
Weizmann Institute of Science, Israel (Advisor: Prof. M. van der Boom)
- October 2012 :** **Visiting Researcher**
Department of Chemistry
University of Cambridge, UK (Advisor: Prof. J. Nitschke)
- January-May 2009 :** **Visiting Researcher**
Department of Radiology and Nuclear Medicine,
Vrije Universiteit, The Netherlands (Advisor: Prof. G. van Dongen)
- 2008-2011 :** **Doctoral Candidate**
Department of Chemistry, Materials and Chemical Engineering,
Politecnico di Milano, Italy (Advisor: Prof. M. Zanda.)
- 2007 :** **Summer Research Fellow of JNCASR**
Department of Inorganic and Physical Chemistry,
Indian Institute of Science, Bangalore (Advisor: Prof. P. S. Mukherjee)
- 2007 :** **Summer Research Fellow of Indian Academy of Sciences**
IICT, Hyderabad (Advisor: Dr. T. K. Chakraborty)

4. AWARDS, RECOGNITIONS AND FELLOWSHIPS (Selected)

- 2022** : JNCASR Best Emerging Young Scientist Award, JNCASR, India
- 2021** : CSIR Technology Award (Certificate of Merit, Team Member)
- 2020** : Kerala State Young Scientist Award, KSCSTE, Govt. of Kerala
- 2018** : DST selection for 3rd BRICS Young Scientist Conclave (Durban, South Africa)
- 2016** : Ramanujan Fellowship (Faculty Level), SERB, India
- 2016** : DST – INSPIRE Faculty Award, Department of Science and Technology, India

2016 : Prof. Varghese Paul Endowment Lecture, S H College (Thevara, Kerala), India
2015 – 2016 : Humboldt Fellowship, Alexander von Humboldt Foundation, Germany
2015 : SFB 677 Research Fellowship, SFB 677 and University of Kiel, Germany
2014 – 2015 : Fellowship from NOFAR Grant, Israel Ministry of Trade and Industry
2011 – 2014 : Marie Curie Early Stage Researcher Fellowship
2008 – 2010 : Borsa di Studio (PhD), Government of Italy
2007 : First Position – M.Sc. Chemistry (Organic Chemistry), M G University, India
2007 : Summer Research Fellowship, Indian Academy of Sciences
2007 : Summer Research Fellowship, JNCASR, India
2005 : College Topper, BSc. Chemistry, Sacred Heart College (Thevara, Kerala), India
2005 : Prof. P. J. Joseph Award (Topper, 3rd Year BSc. Chemistry)
2005 : Prof. Fr. George Kallarackal Award (Topper, 3rd Year BSc. Chemistry)
2005 : Prof. M. V. Varghese Endowment (Topper, 3rd Year BSc. Chemistry)
2004 : Prof. Sitarama Iyer Award (Topper, 2nd Year BSc. Chemistry)
2003 : Prof. K. T. Kerala Varma Award (Topper, 1st Year BSc. Chemistry)
2000 : Mathrubhumi Scholarship 6th Rank (Kerala State Level)
1997 – 2007 : National Merit Scholarship (Yearly Award, continuous for 10 years)
 Upper Secondary Scholarship Winner
 PCM Scholarship National Rank Holder

5. PATENTS

- “A Process for Carbon Dioxide Adsorption Induced Switchable Antibacterial Activity of a Smart Covalent Organic Framework”
 Ajayaghosh, A.; Mal, A.; Mishra, R. K.; Kumar, D. B. S.; Jacob, J.; **Sreejith Shankar**
 PCT Application PCT/IN2023/050015, **2023**
 Indian Patent Application 202211000696, **2022**
- “A Superhydrophobic Composite and Multifunctional Applications Thereof”
Sreejith Shankar; Anjali, N.; Hareesh, U. S.; Ajayaghosh, A.
 JP 2023-514872, **2023**, US 18/025,156, **2023**,
 PCT Application No. PCT/IN2021/050878, **2021**.
 Indian Patent Application 202011038721, **2020**.
- “Disinfection and *in situ* Flocculation-Solidification Process for Pathogenic Medical Waste Disposal”
Sreejith Shankar; Nair, S. S.; Radhakrishnakurup, A.; Vijayan, V.; Mohamed, P. A. A.; Hareesh, U. S.; Sukumaran, R. K.; Savithri, S.; Devi, P. S.; Ajayaghosh, A.
 PCT Application No. PCT/IN2022/050847, **2022**
 Indian Patent Application 202111045341, **2021**.
- “An Improved Disinfection/Solidification Process for Pathogenic Medical Waste Disposal”
Sreejith Shankar; Nair, S. S.; Suja P.; Hareesh, U. S.; Sukumaran, R. K.; Savithri, S.; Devi, P. S.; Ajayaghosh, A.
 PCT Application No. PCT/IN2022/050745, **2022**
 Indian Patent Application 202111045340, **2021**

5. “Temperature Programmable Small Molecules and Prototypes for Thermoresponsive Smart Windows and Applications Thereof”
Ajayaghosh, A.; Patra, D.; **Sreejith Shankar**
PCT Application PCT/IN2022/050852, **2022**
AOP Application over IN 201911052506, Application No. 202113045339, **2021**
6. “Antibacterial Multi-Charged Metal Complexes and Coatings with Metal Nanoparticles Thereof”
Sreejith Shankar; Anjali, N.; Hareesh, U. S.; Pottath, S.; Vijayan, V.; Pillai, S.; Sukumaran, R. K.; Ajayaghosh, A.
Indian Patent Application 202111015509, **2021** (PCT Pending)
7. “A Functional and Transparent Gel Electrolyte System and Fast Switching Electrochromic/ Electrochemical Devices Thereof”
Deb, B.; Ajayaghosh, A.; Venugopal, R.; Prabhu, P. G. T.; **Sreejith Shankar**
PCT Application WO 2021161348 A1 20210819, **2021** (PCT/IN2021/050143, Filed in **2021**).
8. “Flocculant Based Disinfection Process for Pathogenic Medical Waste Disposal”
Sreejith Shankar; Hareesh, U. S.; Parameswaran, B.; Sukumaran, R. K.; Ajayaghosh, A.
EP 21866230.2, **2023**
PCT Application WO 2022054071 A1 20220317, **2022** (PCT/IN2021/050032, Filed in **2021**).
Indian Patent Application IN 202011039050 A 20220311, **2022** (Filed in **2020**).
9. “Thermoresponsive Molecules for Controlled heat and Light Transmission Windows and Applications Thereof”
Ajayaghosh, A.; Das, S.; Soman, S.; Asok, A.; **Sreejith Shankar**
PCT Application WO 2021124343 A1 20210624, **2021** (PCT/IN2020/050884, Filed in **2020**)
Indian Patent Application IN 201911052506 A 20210625, **2021** (Filed in **2019**).
10. “A Transparent Gel Electrolyte System and Fast Switching Electrochromic Devices Thereof”
Deb, B.; Ajayaghosh, A.; Venugopal, R.; Prabhu, P. G. T.; **Sreejith Shankar**
Indian Patent Application IN 202011006474 A 20210820, **2021** (Filed in **2020**).
11. “Preparation of Transition Metal Coordination Polymers with Adamantanetetrakispyridine”
van der Boom, M. E.; Lahav, M.; Hamami, S.; Di-Gregorio, M-C.; Wan, Q.; **Sreejith Shankar**
US CIP Application, US 20160271582 A1 20160922, **2016**
Additional Filings
1(a) US 9707540B2, **2017**
12. “Metal-Based Tris-Bipyridyl Complexes and Uses Thereof In Electrochromic Applications”
van der Boom, M. E.; Lahav, M.; **Sreejith Shankar**
WO 2015075714 A1 20150528, **2015**
Additional Filings:
2(a) US 9847494B2, **2017**
2(b) EP 3072171A1, **2016**
2(c) CN 105793241B, **2016**
2(d) IL245702D0, **2016**
2(e) IL229525D0, **2014**

In News: [http://www.illist.co/technology_page/High-Performance%20Electrochromic%20 Devices](http://www.illist.co/technology_page/High-Performance%20Electrochromic%20Devices)

13. “Preparation of transition metal complex MOFs with polypyridyl ligands”

van der Boom, M. E.; Lahav, M.; Balgley, R.; **Sreejith Shankar**

WO 2015008280 A1 20150122, **2015**

Additional Filings

3(a) US 9611218B2, **2017**

3(b) EP 3022250A4, **2017**

3(c) CN 105873587A, **2016**

In news: http://www.illist.co/technology_page/metal-organic-frameworks-mof-for-gas-adsorption
https://finder.startupnationcentral.org/m/technology_page/metal-organic-frameworks-mof-for-gas-adsorption

6. PUBLICATIONS

1. Das, S.; Patra, D.; **Sreejith Shankar**, Ajayaghosh, A. “Photocycloaddition as a Tool for LCST Modulation in a Molecular π -System to Control Transmission of Solar Radiation” *Angew. Chem., Int. Ed.* **2022**, *61*, e202207641.
2. Indulekha, M.; Anjana, P. M.; Anjali, N.; Patra, D.; Sukumaran, P. A.; Pillai, R. S.; Rakhi, R. B.; **Sreejith Shankar***, Ajayaghosh, A.* “Tunable Capacitive Behavior in Metallopolymer-based Electrochromic Thin Film Supercapacitors” *ACS Appl. Mater. Interfaces*, **2022**, *14*, 31900-31910.
3. Indulekha, M.; Anjali, N.; Madhavan, N, D.; **Sreejith Shankar***; Deb, B.; Ajayaghosh, A.* “Ligand Controlled Electrochromic Diversification with Multi-Layer Coated Metallo-supramolecular Polymer Assemblies” *ACS Appl. Mater. Interfaces*, **2021**, *13*, 5245–5255.
4. Anjali, N.; Indulekha, M.; **Sreejith Shankar***; Ajayaghosh, A.* “Thermochromic Color Switching to Temperature Controlled Volatile Memory and Counter Operations with Metal-Organic Complexes and Hybrid Gels” *Angew. Chem., Int. Ed.* **2021**, *60*, 455-465.
5. Indulekha, M.; Anjali, N.; Rakhi, R. B.; **Sreejith Shankar***; Ajayaghosh, A.* “Metal Ion Induced Capacitance Modulation in Near-Isostructural Complexes Derived Electrochromic Coordination Polymers” *Mater. Today Chem.* **2020**, *16*, 100260 (*Invited Article*).
6. Ghosh, S.; **Sreejith Shankar***; Philips D. S.; Ajayaghosh A.* “Diketopyrrolopyrrole-based Functional Supramolecular Polymers: Next Generation Materials for Optoelectronic Applications” *Mater. Today Chem.* **2020**, *16*, 100242 (*Invited Article*).
7. **Sreejith Shankar** “Chromogenic Materials for Smart Energy Management and Utilization – An Overview” *The BRICS Scientist: Science & Technology Papers*, **2019**, *1*, 3.

8. **Sreejith Shankar**; Krahwinkel, B.; Peters, M.; Grote, D.; Sander, W.; Steinborn, K.C.; Lohmiller, T.; Herges, R.
 “Light Controlled Switching of the Spin State of Iron(III)”
Nature Commun. **2018**, *9*, 4750.
Highlights: GIT Labportal, **2018** (<https://www.git-labor.de/forschung/chemie-physik/molekulare-spinschalter>)
Highlights: Analytic News, **2018** (<https://analytik.news/Presse/2018/723.html>)
Highlights: Solarify, **2018** (<https://www.solarify.eu/2018/11/30/769-lichtschalter-fuer-enzyme/>)
Highlights: University of Kiel, **2018** (<https://www.uni-kiel.de/en/details/news/translate-to-english-lichtschalter-fuer-enzyme/>)
Highlights: Science and Technology Research News, **2018**
 (<https://www.scienceandtechnologyresearchnews.com/the-light-switch-which-activates-enzymes/>)
Highlights: Research in Germany, **2018** (http://www.research-in-germany.org/news/2018/11/2018-11-29_The_light_switch_which_activates_enzymes)
Highlights: Innovations Report, **2018** (<https://www.innovations-report.com/html/reports/life-sciences/the-light-switch-which-activates-enzymes.html>)
Highlights: idw - Informationsdienst Wissenschaft (idw-online), **2018** (<https://nachrichten.idw-online.de/en/2018/11/28/the-light-switch-which-activates-enzymes/>)
9. Ranjan, P.; **Sreejith Shankar**; Popovitz-Biro, R.; Cohen, S.; Kaplan-Ashiri, I.; Dadosh, T.; Shimon, L.; Visic, B.; Tenne, R.; Lahav, M.; van der Boom, M. E.
 “Decoration of Inorganic Nanostructures by Metallic Nanoparticles to Induce Fluorescence, Enhance Solubility, and for Bandgap Tuning”
J. Phys. Chem. C **2018**, *122*, 6748-6759.
10. Ranjan, P.; **Sreejith Shankar**, Popovitz-Biro, R.; Cohen, S.; Pinkas, I.; Tenne, R.; Lahav, M.; van der Boom, M. E.
 “Tubular Hybrids: A Nanoparticle – Molecular Network”
Langmuir **2018**, *34*, 2464-2470.
11. **Sreejith Shankar**; Chovnik, O.; Shimon, L.; Lahav, M.; van der Boom, M. E.
 “Directed Molecular Structure Variations of Three-Dimensional Halogen-Bonded Organic Frameworks (XBOFs)”
Cryst. Growth Des. **2018**, *18*, 1967-1977.
12. Elool Dov, N.; **Sreejith Shankar**; Cohen, D.; Bendikov, T.; Rehav, K.; Shimon, L.; Lahav, M.; van der Boom, M. E.
 “Electrochromic Metallo-Organic Nanoscale Films: Fabrication, Color Range and Solid-State Devices”
J. Am. Chem. Soc. **2017**, *139*, 11471–11481.
13. **Sreejith Shankar**; Orbach, M.; Kaminkar, R.; Lahav, M.; van der Boom, M. E.
 “Gold Nanoparticle Assemblies on Surfaces: Reactivity Tuning through Capping Layer and Cross-Linker Design”
Chem. Eur. J. **2016**, *22*, 1728–1734.

14. Lahav, M.; Eloom-Dov, N.; **Sreejith Shankar**; van der Boom, M. E.
 “Coordination-based Molecular Assemblies as Highly Efficient Electrochromic Materials”
Abstracts of Papers ACS, **2016**, *251*, 1155
15. Balgley, R.; **Sreejith Shankar**; Lahav, M.; van der Boom, M. E.
 “Rerouting Electron Transfer in Molecular Assemblies by Redox-Pair Matching”
Angew. Chem. Int. Ed. **2015**, *54*, 12457–12462; *Angew. Chem.* **2015**, *127*, 12634–12639.
Special Issue: Chemistry in Germany and Israel
16. **Sreejith Shankar**; Lahav, M.; van der Boom, M. E.
 “Coordination Based Molecular Assemblies as Electrochromic Materials: Ultra-High Coloration Efficiencies and Switching Stability”
J. Am. Chem. Soc. **2015**, *137*, 4050-4054.
17. Orbach, M.; **Sreejith Shankar**; Zenkina, O. V.; Milko, P.; Diskin-Posner, Y.; van der Boom, M. E.
 “Generation of Mono- and Bimetallic Palladium Complexes and Mechanistic Insight into an Operative Metal Ring-Walking Process”
Organometallics **2015**, *34*, 1098-1106.
18. **Sreejith Shankar**; Balgley, R.; Lahav, M.; Cohen, S. R.; Popovitz-Biro, R.; van der Boom, M. E.
 “Metal Organic Microstructures: From Rectangular to Stellated and Interpenetrating Polyhedra”
J. Am. Chem. Soc. **2015**, *137*, 226–231.
19. Boterashvili, M.; Lahav, M.; **Sreejith Shankar**; Facchetti, A.; van der Boom, M. E.
 “On-Surface Solvent-Free Crystal-to-Co-crystal Conversion by Non-Covalent Interactions”
J. Am. Chem. Soc. **2014**, *136*, 11926–11929.
Highlights: ChemistryViews, **2014** (https://www.chemistryviews.org/details/news/6543561/Remold_Crystals_with_Vapor.html)
20. Cohen, R.; Vugts, D.; Visser, G. M. W.; Stigter-vanwalsum, M.; Bolijn, M.; Spiga, M.; Lazzari, P.; **Sreejith Shankar**; Sani, M.; Zanda, M.; van Dongen, G. A. M S.
 “Development of Novel ADCs: Conjugation of Tubulysin-Analogues to Trastuzumab Monitored by Dual-Radiolabeling”
Cancer Res. **2014**, *74*, 5700-5710.
Highlights: Oncological Research (<https://oncologischonderzoek.nl/page.php?al=Preklinische-testen-van-tubulysine-trastumuzab-conjugaten>)
21. **Sreejith Shankar**; Bigotti, S.; Lazzari, P.; Manca, I.; Spiga, M.; Sani, M.; Zanda, M.
 “Synthesis and Cytotoxicity Evaluation of Diastereoisomers and N-Terminal Analogues of Tubulysin-U”
Tett. Lett. **2013**, *54*, 6137-6141.
22. **Sreejith Shankar**, Jagodzinska, M.; Malpezzi, L.; Lazzari, P.; Manca, I.; Greig, I. R.; Sani, M.; Zanda, M.
 “Synthesis and Structure–Activity Relationship Studies of Novel Tubulysin U Analogues – Effect on Cytotoxicity of Structural Variations in the Tubuvaline Fragment”
Org. Biomol. Chem. **2013**, *11*, 2273-2287.

23. Goss, R. J. M.; **Sreejith Shankar**; Fayad, A. A.
 “The Generation of “unNatural” Products - Synthetic Biology Meets Synthetic Chemistry”
Nat. Prod. Rep. **2012**, *29*, 870-889. (**Invited Article**)
24. Cohen, R.; Vugts, D.; **Sreejith Shankar**; Visser, G.; Zanda, M.; van Dongen, G. A. M. S.
 “Radiolabeling of a Supertoxic Tubulysin Analogue and the Development of Antibody-Drug
 Conjugates”
J. Nucl Med. **2012**, *53*, 1541.
25. **Sreejith Shankar**, Sani, M.; Saunders, F. R.; Wallace, H. M.; Zanda, M.
 “Total Synthesis and Cytotoxicity Evaluation of an Oxazole Analogue of Tubulysin U”
Synlett **2011**, *12*, 1673-1676.
26. Bigotti, S.; Olimpieri, F.; **Sreejith Shankar**; Pinna, G.; Altomonte, S.; Zanda, M.
 “The Trifluoroethylamine Function as Peptide Bond Replacement: New Developments and Findings”
Chimica Oggi (Chemistry Today) **2009**, *27(3)*. (**Invited Article**)
27. **Sreejith Shankar**; Sani, M.; Terraneo, G.; Zanda, M.
 “Studies towards a Novel Synthesis of Tubulysins: Highly Asymmetric Aza-Michael Reactions of 2-
 Enoylthiazoles with Metalated Chiral Oxazolidinones”
Synlett **2009**, *8*, 1341-1345.
28. **Sreejith Shankar**
 “Martin Sulfurane – A Versatile Reagent for Organic Synthesis”
Synlett **2009**, *5*, 850-851.

7. PROJECTS AND FUNDING

- Development of Antimicrobial Formulations and Coatings on Cotton Substrates for Biodegradable Paper-based Masks

Funding Agency	: LaFabrica Craft Pvt. Ltd., Goa
Role	: Principal Investigator
Duration	: 2022-2023
Status	: On-going
- Optimization Studies on Disinfection-Solidification Systems for Pathogenic Biomedical Waste Disposal

Funding Agency	: Bio Vastum Solutions Pvt. Ltd., Angamaly
Role	: Principal Investigator
Duration	: 2022-2023
Status	: On-going
- Collaborative Research for Accelerated Development of Materials & devices for Energy harvesting and conservation Technologies (CRADMET, IC-MAP)

Funding Agency	: DST
Role	: Principal Investigator
Duration	: 2022-2025
Status	: On-going

4. Disinfection-Solidification System for Pathogenic Medical Waste Disposal
 - Funding Agency : CSIR-NIIST
 - Role : Principal Investigator
 - Duration : 2022-2023
 - Status : On-going
5. Organic-Inorganic Hybrid Nanomaterials for Non-Conventional Energy Technologies (Nanomission)
 - Funding Agency : DST
 - Role : Investigator
 - Duration : 2022-2027
 - Status : On-going
6. Composite Materials for Flexible Electrochromic Devices
 - Funding Agency : CSIR
 - Role : Co-Principal Investigator
 - Duration : 2020-2023
 - Status : On-going
7. Flocculant based Disinfection Systems for Pathogenic Medical Waste Disposal
 - Funding Agency : CML Biotech Pvt. Ltd.
 - Role : Co-Principal Investigator
 - Duration : 2021-2022
 - Status : On-going
8. Dynamic Molecular, Supramolecular and Surface Chemistry for Spatiotemporal Modulation of Smart Advanced Functional Materials
 - Funding Agency : DST-SERB
 - Role : Principal Investigator
 - Duration : 2017-2022
 - Status : Completed
9. Fluorescent Pigments for Currency Application
 - Funding Agency : CSIR
 - Role : Co-Investigator and Team Member
 - Duration : 2020-2022
 - Status : On-going
10. Translating Electrochromic Devices to 1' × 1' Dynamic Windows: Towards Industrial Smart Glass Technologies
 - Funding Agency : CSIR
 - Role : Co-Principal Investigator
 - Duration : 2020-2022
 - Status : On-going

11. Chromogenic Materials and Inks for Smart Coating and Printable Applications

Funding Agency : CSIR
Role : Co-Principal Investigator
Duration : 2020-2023
Status : On-going

12. Fluorescent Materials for Security Applications

Funding Agency : CSIR
Role : Co-Investigator and Team Member
Duration : 2018-2020
Status : Completed

13. Electrochromic Devices for Efficient Energy Management and Utilization

Funding Agency : CSIR
Role : Co-Principal Investigator
Duration : 2018-2020
Status : Completed

14. Chromogenic Materials for Smart Coating Applications

Funding Agency : CSIR
Role : Co-Principal Investigator
Duration : 2018-2020
Status : Completed

8. INDUSTRIAL OUTREACH

1. PI: Flocculant based Disinfection Systems for Pathogenic Medical Waste Disposal; Technology transferred to M/s Bio Vastum Solutions Pvt. Ltd., Angamaly, Kerala (Indian Patent Application 202111045341, **2021**, Indian Patent Application 202111045340, **2021**, PCT Application PCT/IN2021/050032, **2021**, Indian Patent Application 202011039050, **2020**).
2. Team Member and Co-Investigator: Development of a Technology on Fluorescent Materials for Anticounterfeiting and Security Applications; Know-how transferred to HueBright, Bengaluru. **CSIR Technology Award-2021** (Certificate of Merit) in Physical Sciences incl. Engineering.
3. ADRO Technologies Ltd.- Start-up Company launched in Israel in 2015, based on the MOF project initiated in 2011 (*J. Am. Chem. Soc.* **2015**, *137*, 226–231; WO 2015008280 A1 20150122, **2015** and US 20160271582 A1 20160922, **2016**).

9. ORAL / POSTER PRESENTATIONS (Selected)

1. “Light – Matter Interactions: UV-vis Spectroscopy as a Powerful Analytical Tool” Certificate Course in ‘Sophisticated Instrumentation Techniques’, Kannur University, February 2023 (**Invited Oral Presentation**)

2. “Smart Materials and Devices for Multifunctional Applications” MGU ChemFest, Mahatma Gandhi University, Kottayam, December 2022 (***Invited Oral Presentation***)
3. “Light – Matter Interactions: UV-vis Spectroscopy as a Powerful Analytical Tool” Refresher Course Winter School in Physics and Chemistry, Kannur University , December 2022 (***Invited Oral Presentation***)
4. “Smart Materials for Futuristic Applications” Materials Research Society of India (MRSI) Trivandrum Chapter Lecture Series, Kerala University, India, November 2022 (***Invited Oral Presentation***)
5. “Smart Materials and Devices for Multifunctional Fenestration in Sustainable Buildings” 16th JNCAR Research Conference on Chemistry of Materials, JNCASR, Bengaluru, October 2022 (***Invited Oral Presentation***)
6. “Visualizing Chemistry and Chemical Processes - Color, Structure and Properties” Chem Alumni “IGNITE” Lecture Series, Sacred Heart College, Kerala, October 2022 (***Invited Oral Presentation***)
7. “Visualizing Chemistry and Chemical Processes - Color, Structure and Properties” Al Ameen College College, Kerala, October 2022 (***Invited Oral Presentation***)
8. “Dual Solidification-Disinfection System for Pathogenic Biomedical Waste Disposal” International Conference on Chemistry and Applications of Soft Materials (CASM 2022), CSIR-NIIST, Thiruvananthapuram (***Invited Oral Presentation***)
9. “Chemistry – Tales from the “Sustainable” Central Science” National Science Day Lecture, Al Ameen College, Edathala, March 2022 (***Invited Oral Presentation***)
10. “Smart Materials - Chemistry, Applications and Perspectives” Short Term Training Program on “Chemistry of Advanced Materials and their Applications”, Maulana Abul Kalam Azad University of Technology (Formerly West Bengal University of Technology), West Bengal, December 2021 (***Invited Oral Presentation***)
11. “Biopolymers and Metallopolymers for Sustainable Energy Applications” KTU Sponsored (Online) One Week Faculty Development Programme on “Recent Development of Biopolymer and Sustainable Composites for Engineering Applications”, Sree Buddha College of Engineering, Pattoor, March 2021 (***Invited Oral Presentation***)
12. “Quest for Futuristic Systems - Towards Sustainable Smart Materials and Devices” AICTE Sponsored Online Short Term Training Program (STTP) on “Smart Materials, Automation and its Future Impact on Humans” (Part: 2) SAFIH 2020, Sree Buddha College of Engineering, Pattoor, November 2020 (***Invited Oral Presentation***)
13. “Smart Materials – Futuristic Roads towards Sustainability” International Webinar on Smart Functional Materials, Govt. College Kariavattom, Thiruvananthapuram, August 2020 (***Invited Oral Presentation***)
14. “Concepts and Materials for Smart and Sustainable Future” International Webinar, PSGR Krishnammal College for Women, Coimbatore, July 2020 (***Invited Oral Presentation***)
15. “The Tale of Smart Materials – Towards Futuristic and Sustainable Applications”, National Webinar, Al Ameen College, Edathala, July 2020 (***Invited Oral Presentation***)

16. "Smart Materials: Perspectives Towards Sustainable and Futuristic Applications", International Seminar on Organic and Materials Chemistry", Kozhencherry, India, February 2020 (**Invited Oral Presentation**)
17. "Multifunctional Nanoscale Electrochromic Films and Devices for Smart Energy Utilization", 6th International Conference on Advanced Nanomaterials and Nanotechnology (ICANN 2019), Guwahati, India, December 2019 (**Oral Presentation**)
18. "Smart Materials for Efficient Energy Management and Utilization", 3rd International Conference on Advanced Functional Materials (ICAFM), Thiruvananthapuram, India, December 2019 (**Invited Oral Presentation**)
19. "Consumer Empowerment in the Fight Against Fakes", Authentication Forum 2019, New Delhi, India, November 2019 (**Invited Panelist**)
20. "Smart Materials for Futuristic Applications", FCBS-JNCASR Workshop for Chemistry Teachers and Students, Thiruvananthapuram, India, November 2019 (**Invited Oral Presentation**)
21. "Light Controlled Switching of the Spin States in Enzyme like Iron(III) Co-ordination Assemblies" Symposium on Recent Advances in Chemical Sciences, Thiruvananthapuram, India, March 2019 (**Invited Oral Presentation**)
22. "Electrochromism – From Molecules to Materials and Devices for Smart Energy Utilization" International Conference on Materials for the Millennium (MATCON 2019), Kochi, India, March 2019 (**Invited Oral Presentation**)
23. "Chemistry in Action – A Paradigm Shift from Perception to R&D" CSIR-NIIST Science Outreach Program 2019, Thiruvananthapuram, January 2019 (**Invited Oral Presentation**).
24. "Chromogenic Materials for Smart Energy Management and Utilization" BRICS Young Scientists Alumni Meet, NIAS-Bengaluru, India December 2018 (**Invited Oral Presentation**).
25. "Nanoscopic Molecular Assemblies for Smart and Multifunctional Applications" Calicut University: Refresher Course in Nanoscience, Kozhikkode, India, December 2018 (**Invited Oral Presentation**)
26. "Adventures and Tales in Chemistry – Dare to Dream", Morning Star College, Angamali (Kerala), India, September 2018 (**Invited Oral Presentation**).
27. "Smart Management in Indoor Energy Utilization - Electrochromism and its Perspectives" 3rd BRICS Young Scientists Conclave, Durban, South Africa, June 2018 (**Invited Oral Presentation**).
28. "Electrochromism – From Molecules to Assemblies, Materials and Devices" National Convention of Electrochemists (NCE20), VIT, Vellore, India, June 2018.
29. "Electrochromism – From Molecules to Assemblies, Materials and Devices" Colloquium on Smart Materials, SRIBS (KSCSTE), Kerala, November 2017 (**Invited Oral Presentation**).
30. "Research as a Career in Chemistry – Opportunities and Challenges" Prof. Varghese Paul Endowment Lecture, Sacred Heart College, Thevara, September 2016 (**Invited Oral Presentation**).
31. "Coordination-Induced Dynamic Supramolecular Architectures: Molecule-based Materials in-Solution and on-Surface" Institute for Materials Science, University of Kiel, June 2016 (**Invited Oral Presentation**)
32. "Iron (III) Porphyrins – Towards the First Iron-based Light Driven-Coordination Induced Spin State Switch" AvH Network Meeting, Düsseldorf, Germany, February-March 2016 (**Oral Presentation**).

33. “Pyridine derived Molecular Assemblies - Designing Molecule-based Materials” SFB 677 Summer School, Schleswig, Germany, August 2015 (**Oral Presentation**).
34. “Metal Organic Frameworks for Clean Energy Applications” Israel-Greece Joint Meeting on Nanotechnology & Bionanotechnology, Israel, October 2014 (**Oral Presentation**).
35. “Homogeneously Crystalline Metal-Organic Microstructures” Dutch-Israeli Chemistry Meeting, Twente, The Netherlands, May 2014 (Poster Presentation)
36. “Surface Confined Metal-Organic Architectures as Efficient Electrochromic Materials” Dutch-Israeli Chemistry Meeting, Twente, The Netherlands, May 2014 (Poster Presentation)
37. “Metal Organic Frameworks for Clean Energy Applications” AERI Symposium (Sustainable Energy 2013-14), Israel, February 2014 (**Oral Presentation**).
38. “Morphology Control in MOFs – From Spheres to Bricks and Stellated Polyhedra”, Joint ReAD-DYNAMOL Meeting and Centre of Systems Chemistry Symposium, Groningen, The Netherlands September, 2013 (**Oral Presentation**).
39. “Surface Confined Metal Organic Assemblies as Efficient Electrochromic Materials”, NCMST-2013, IIST Thiruvananthapuram, July 2013 (**Oral Presentation**).
40. “Surface Confined Redox Active Metal-Organic Architectures” DYNAMOL Meeting, Barcelona, Spain, April, 2013 (**Oral Presentation**).
41. “Dynamic Metal-Organic Supramolecular Architectures” Annual Meeting of Israel Chemical Society, Tel Aviv, Israel, February 2013 (Poster Presentation), **Chair of the session on Supramolecular Chemistry**.
42. “Dynamic Metal Organic Supramolecular Assemblies”, November 2012, NIIST Thiruvananthapuram, India (**Oral Presentation**).
43. “Metal Directed Coordination Chemistry of Polypyridyl Ligands and Complexes” DYNAMOL Review Meeting, Cambridge, UK, September 2012 (**Oral Presentation**).
44. “Homogeneously Micro-structured Metal-Organic Coordination Polymers” From Molecules to Materials –Advances and Challenges, Israel, July 2012 (Poster Presentation), **Member of the organizing committee**.
45. “Homogeneously Micro-structured Crystalline Nickel-Organic Coordination Polymers” DYNAMOL Meeting, Champéry, Switzerland, March 2012 (**Oral Presentation**).
46. “Scientific Principles of Management in Pharmaceutical Industry” PUMBA, University of Pune, India, August 2010 (**Invited Oral Presentation**).
47. “Development of Tubulysin Analogs: Peptidomimetics Targeting Cancer and Angiogenesis through Immunoconjugates”, 12th Belgian Organic Synthesis Symposium, Namur, Belgium, July 2010 (Poster Presentation).

10. ORGANIZATIONAL/PROFESSIONAL ACTIVITIES

1. National Conference on Advanced Materials and Manufacturing Technologies (AMMT 2023), CSIR-NIIST, Thiruvananthapuram, February, 2023
Member of the Organizing Committee

2. International Conference on Chemistry and Applications of Soft Materials (CASM 2022), CSIR-NIIST, Thiruvananthapuram, July, 2022
Co-convener
3. National Webinar on Recent Advances in Physics of Materials (RAPM 2021), CSIR-NIIST, Thiruvananthapuram, December 2021
Member of the Organizing Committee
4. 14th International Conference on Ecomaterials (ICEM-14), CSIR-NIIST, Thiruvananthapuram, February 2020
Member of the organizing committee
5. 3rd International Conference on Advanced Functional Materials (ICAFM), CSIR-NIIST, Thiruvananthapuram, December 2019
Member of the organizing committee
6. Chemistry and Physics at the Excited States, CSIR-NIIST, Thiruvananthapuram, November 2017
Member of the organizing committee
7. 8th East Asia Symposium on Functional Dyes and Advanced Materials (EAS8), CSIR-NIIST, Thiruvananthapuram, September 2017
Member of the organizing committee
8. 15th European Symposium on Organic Reactivity (ESOR), Kiel, Germany, August 2015
Member of the organizing committee
9. Annual Meeting of Israel Chemical Society, Tel Aviv, Israel, February 2013
Chair of the session on Supramolecular Chemistry
10. From Molecules to Materials – Advances and Challenges, Israel, July 2012
Member of the organizing committee
11. DYNAMOL Meeting, Israel, July 2012
Coordinator and Organizer
12. International Symposium on Advances in Organic Chemistry (INSOC), India, January 2006
Member of the organizing committee
6. **Reviewer**
Nature Publishing Group, RSC, PLOS, Wiley
7. Universal Journal of Applied Sciences, Horizon Group of Publications, U. S. A.
Member of the Editorial Board (2013-Present)
9. Public Science Framework, American Institute of Science, U. S. A
Member of the Editorial Board / Peer Review (2015-Present)
10. Grievances Redressal Mechanism, M. G. University, Kottayam
Member (2006)
11. Chemistry Association, Sacred Heart College, Kerala, India
Secretary (2005)

11. GROUP AWARDS

1. Mr. Dipak Patra, ACS Omega Best Oral Presentation Award, International Symposium on New Trends in Applied Chemistry (NTAC 2023), Sacred Heart College, Thevara, India, February 2023

2. Ms. Anisha Mathew, ACS Applied Energy Materials Best Poster Award, International Symposium on New Trends in Applied Chemistry (NTAC 2023), Sacred Heart College, Thevara, February 2023
3. Mr. Dipak Patra, ACS Materials Au Best Poster Award at the International Workshop on Nanoengineered Materials 2023, IISER, Thiruvananthapuram, January 2023
4. Mr. Dipak Patra, Best Poster Award, 16th JNCASR Research Conference on Chemistry of Materials, JNCASR Bengaluru, October 2022
5. Ms. Indulekha M. ACS Appl. Mater. Interfaces Best Poster Award, International Conference on Chemistry and Applications of Soft Materials (CASM 2022), CSIR-NIIST, Thiruvananthapuram, India, July 2022
6. Ms. Anjali N., ACS Organic Inorganic Au Best Poster Award, International Conference on Chemistry and Applications of Soft Materials (CASM 2022), CSIR-NIIST, Thiruvananthapuram, India, July 2022
7. Mr. Dipak Patra, ACS Langmuir Best Poster Award, International Conference on Chemistry and Applications of Soft Materials (CASM 2022), CSIR-NIIST, Thiruvananthapuram, India, July 2022
8. Ms. Anjali N., Best Poster Award, National Conference on Materials Science and Technology (NCMST-2021), IIST, Thiruvananthapuram, India, December 2021
9. Ms. Anjali N., Royal Society of Chemistry Best Poster Award, 14th International Conference on Ecomaterials (ICEM-14), CSIR-NIIST, Thiruvananthapuram, India, February 2020
10. Ms. Indulekha M., Symposium Chair Best Poster Award at REIS-HOKUDAI International Symposium, Japan, December 2021
11. Ms. Indulekha M., Best Poster Award at the National Symposium on Recent Advances in the Physics of Materials, CSIR-NIIST, Thiruvananthapuram, December 2021
12. Ms. Priya K. P., ASPIRE Scholarship, Government of Kerala, January 2020
13. Ms. Indulekha M., Best Oral Presentation Award, National Seminar on Advances in Electrochemistry and Materials Science – Frontiers in Chemical Sciences, Calicut, India, January 2020.
14. Ms. Anjali N., Best Poster Award, 3rd International Conference on Advanced Functional Materials (ICAFM), Thiruvananthapuram, India, December 2019.

12. RESEARCH INTERESTS

We are a young research group focussing on the development of functional materials in an attempt to afford performance chemicals for smart applications using conventional wet chemical synthesis. The solution and surface chemistries of these smart materials are investigated for energy and energy management applications and for smart coatings and formulations. Most of our research activities are aligned to the missions of Government of India (Atmanirbhar Bharat, Make in India, Smart City Mission, Digital India, Skill India etc.) and are in accordance with the sustainability development goals.

Our group aims at building an expertise that spans basic organic synthesis, coordination chemistry, surface chemistry, electrochemistry and coating formulations. While focussing our thrust expertise on fundamental research to a priori design molecule-based materials with a set of predetermined properties and/or functions, we also partner with industries aiming at bridging the valley of death in translational

research and transforming the acquired fundamental knowledge to demonstrate technologically relevant and marketable products.

Keywords: Energy Management and Conservation, Electrochromic Materials, Fluorescent Materials, Superhydrophobic Materials, Anti-microbial materials, Anti-counterfeiting Technologies, Smart Coatings, Formulations, Thin Films.

13. GROUP MEMBERS

Current Members

1. Ms. Indulekha M. (DST INSPIRE SRF, PhD candidate, Combined Supervision)
2. Ms. Anjali N. (PhD Candidate, Combined Supervision)
3. Mr. Vijayakumar Samiyappan (CSIR-SRF, PhD candidate, Combined Supervision)
4. Mr. Dipak Patra (CSIR-SRF, PhD candidate, Combined Supervision)
5. Ms. Priyanka A. S. (UGC-SRF, PhD candidate, Combined Supervision)
6. Ms. Anisha Mathew (CSIR-JRF, PhD candidate)
7. Ms. Greeshma V. S. (UGC-JRF, PhD candidate)
8. Ms. Delna T. S. (CSIR-JRF, PhD candidate)
9. Ms. Annie P. (UGC-MNRF-JRF, PhD candidate, Combined Supervision)
10. Ms. Sruthi S. Nair (PhD Candidate)
11. Ms. Aswathy N. V. (CSIR-JRF, PhD candidate, Combined Supervision)
12. Mr. Sri Bala Jeya Krishna Sri (Project Associate)
13. Ms. Haritha Jayaraj (Project Associate)
14. Ms. Athulya B. (Project Associate)
15. Ms. Salva M. (Project Associate)
16. Ms. Aarathy Prathap S. (MSc Thesis)
17. Ms. Haritha Sudhi (MSc Thesis)
18. Ms. Ashitha Krishnan (MSc Thesis)

Alumni

1. Mr. Bhuvanesh A. C. (MSc Thesis, 2023)
2. Ms. Sreelakshmi S. (Summer Internship, 2023)
3. Ms. Anjali M. (Summer Internship, 2023)
4. Ms. Sona S. Nair (Summer Internship, 2022)
5. Ms. Purnima Varier R. (MSc Thesis, 2022)
6. Ms. Krishnapriya P. B. (MSc Thesis, Combined Supervision, 2022)

7. Ms. Malavika H. (MSc Thesis, 2022)
8. Ms. Shifa Nourin K. M. (MSc Thesis, 2022)
9. Ms. Ancy Feba (IAS Summer Research Fellow, Combined Supervision, 2022)
10. Ms. Amala Varghese (MSc Thesis, 2022)
11. Ms. Anagha K. (MSc Thesis, 2022)
12. Dr. Swetha S. (Project Associate 2021 – 2022)
13. Ms. Anila S. (Project Assistant, 2018 – 2020)
14. Ms. Nishitha Gopalakrishnan (Project Assistant, 2019 – 2020)
15. Mr. Navin Jacob (Project Assistant, 2019 – 2020)
16. Ms. Sarga Sunil (Project Assistant, 2018-2019)
17. Ms. Neenu N. (Project Assistant, 2018-2019)
18. Ms. Priya K. P. (MSc Thesis, 2019)
19. Ms. Sruthi Krishna S. (MSc Thesis, 2019)
20. Ms. Delna T. S. (MSc Thesis, 2019)
21. Ms. Manju Jose K (MSc Thesis, 2019)
22. Ms. Athira K. S. (MSc Thesis, 2019)
23. Ms. Arathi A. V. (MSc Thesis, 2019)
24. Ms. Meera Joy (BS-MS Intern, 2019)
25. Ms. Anagha Sree S. (Msc Intern, 2019)
26. Ms. Gayathry T. C. (Msc Intern, 2019)
27. Ms. Shyama S. S. (MSc Thesis, 2018)
28. Ms. Bhavya Krishnan (MSc Thesis, 2018)
29. Ms. Manjusha Manohar (MSc Thesis, 2018)
30. Ms. Reshma M. K. (MSc Thesis, 2017)
31. Ms. Anu Mohan (MSc Thesis, 2017)