LOGANATHAN RANGASAMY

About Faculty:

Dr. Loganathan Rangasamy is a recipient of the prestigious DBT Ramalingaswami Re-entry Fellowship-2019 from the Department of Biotechnology (DBT), India, for 2020-2026 (5 years).He completed his bachelor's and master's degree in chemistry from Bharathiar University (PSG College of Arts and Science), Coimbatore, then completed his Ph.D. in Chemistry, thesis entitled 'Studies on DNA and Protein Cleavage and Anticancer Activities of Mixed Ligand Copper(II) Complexes of Diimines' under the guidance of Prof. M. Palaniandavar, FRSC, FASc, FNA, School of Chemistry, Bharathidasan University, India on 03-04-2014. For his first postdoctoral research, he worked with Prof. Gilles Gasser, Department of Chemistry, University of Zurich, Switzerland for one year from 14-09-2014 to 12-09-2015, supported by the Swiss Government Excellence Scholarship. He then moved to Purdue University, United States, for his second postdoctoral studies under the supervision of Prof. Philip S Low, Purdue University, United States, from 01-01-2016 to 24-12-2017. Subsequently, he completed his third Postdoctoral research work with the prestigious Marie Skłodowska-Curie Individual Postdoctoral Fellowship (H2020-MSCA-IF-2016-European Commission) at the Department of Chemistry and Biochemistry, Faculty of Pharmacy, University of San Pablo CEU, Madrid, Spain, under the supervision of Prof. Ana Ramos and Prof. Beatriz de Pascual-Teresa Fernández.

Research Areas:

- Medicinal Chemistry
- Drug Design and Discovery
- Chemical Biology
- Molecular Imaging Agents (Fluorescence, NIR, and radio imaging)
- Immunotherapy

Contact Info:

E-mail: loganathan.r@vit.ac.in

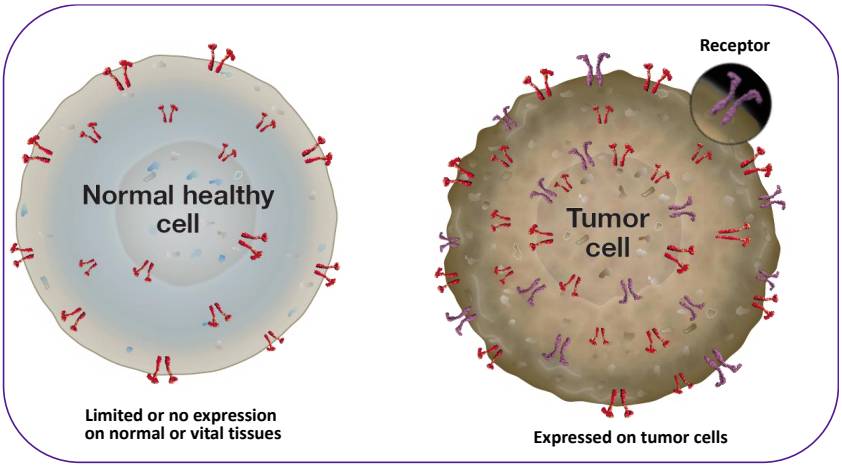
Google scholar link: https://scholar.google.com/citations?user=L80u9LMAAAAJ&hl=en

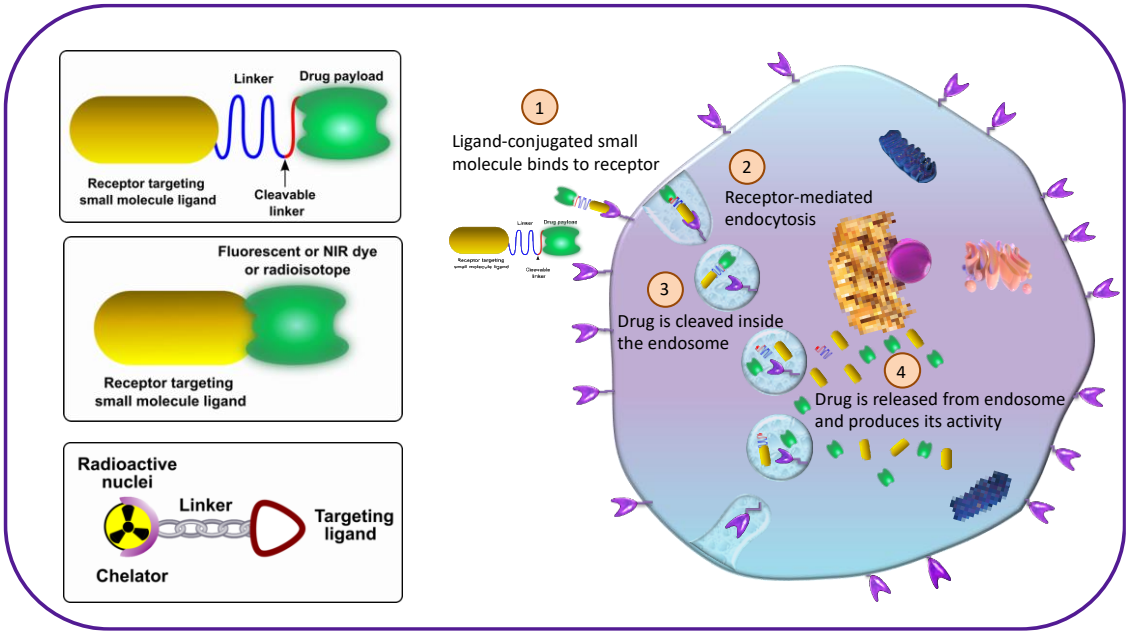
Linked in scholar link: https://www.linkedin.com/in/drug-discovery-10a1a5206

Research Interest

Ligand-Targeted Drug Conjugates (LTDC)

Our research group is focused on multidisciplinary research, spanning the fields of chemistry, chemical biology, cell biology, gene therapy, radiochemistry, molecular imaging, nuclear medicine, and clinical translation. Our group is currently working on “molecularly targeted cancer therapies” including ligand-targeted drug conjugates (LTDC). An LTDC system generally consists of a tumor recognition moiety and a cytotoxic warhead connected through a “smart” linker to form a conjugate. The targeting ligands specifically bind to cell surface proteins/receptors that are known to be expressed predominantly on the cancer cell surface over normal cells. The cytotoxic warhead (drug) is inactive until it enters the tumor cell, to which the targeting ligand targets it. In this way, the anticancer drugs are exclusively delivered to the cancer cells, leaving the normal cells intact. Also, our group focuses on exploiting the above targeting ligands to deliver attached imaging agents to improve early detection of a variety of cancers using molecular imaging techniques such as near-infrared (NIR) and positron emission tomography (PET) imaging.





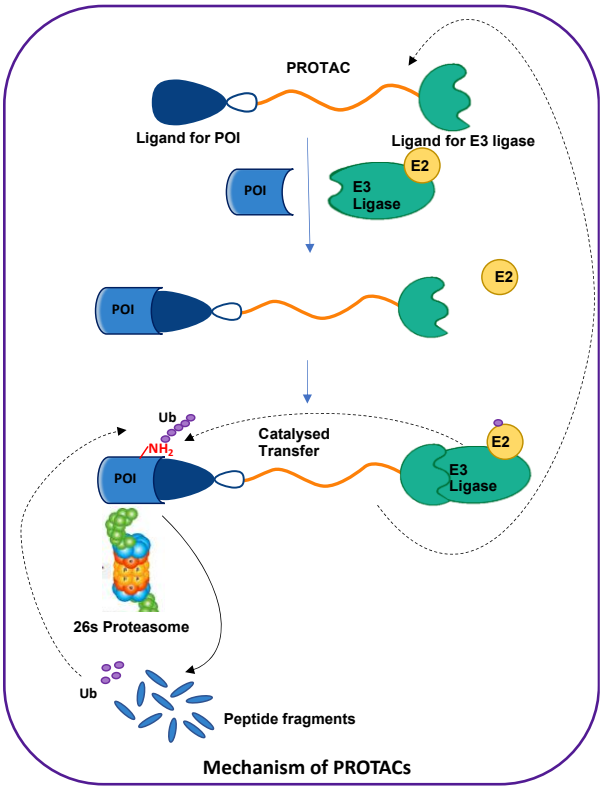
We are also applying computational chemistry methods like ligand- and structure-based drug

design, high throughput virtual screening, investigation of molecular mechanisms of protein/drug, protein/protein and protein/DNA interactions, and optimizations protocols for rational drug design. Followed by structure-based drug design, highly active compounds will be synthesized, and their biological evaluation will be carried out at the interfaces of chemistry with biology and medicine.

Recently we planned to focus on immunotherapy for cancer by developing checkpoint inhibitors to block cancer's false signals restarting the immune system to attack cancer.

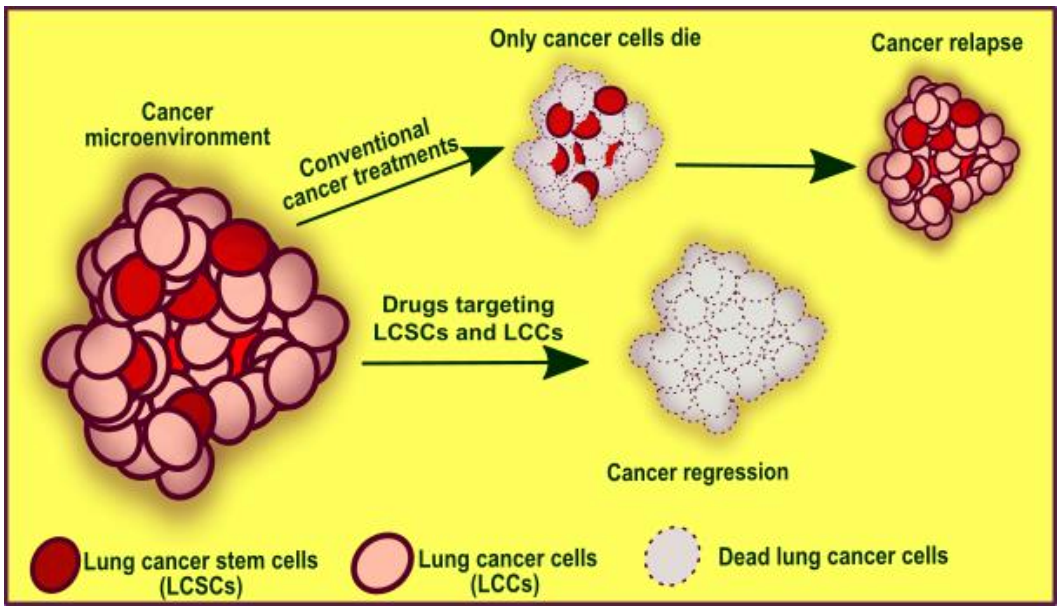
Development of PROteolysis TArgeting Chimeras (PROTACs)

Cancer is the second leading cause of death globally and is responsible for an estimated 9.6 million deaths in 2018. Worldwide, about 1 in 6 deaths, in India 1 in 15 deaths is due to cancer. Despite a significant understanding & substantial improvements, cancer research suffers from extremely low success rates in translating preclinical discoveries into clinical practice. Targeted protein degradation using PROteolysis TArgeting Chimeras (PROTAC), is a new and promising approach in drug discovery for cancer. PROTACs destroy disease-causing proteins by hijacking the natural pathway of ubiquitin proteasome system rather than inhibiting them like a small-molecule inhibitors. Nevertheless, PROTACs have numerous limitations related to poor biodistribution, low stability, and low penetrability in vivo. Most importantly, established small-molecule PROTACs cannot target tumor tissue, thus developing a possibility for off-target effects. This hampers the use of PROTACs in clinical applications. To solve the above problems, at DDU, we are working to link our newly designed PROTACs with a targeting ligand that can deliver the attached PROTACs selectively to cancerous tissue, thereby reducing toxic side effects in the patient and increasing the therapeutic index.



Targeting Cancer Stem Cells (CSCs)

The current treatment methods of treating cancer include conventional treatments and target-specific treatments. However, various literature has established that non-specific treatment methods have bystander effects, leading to a higher rate of morbidity in the treated patients and mental stress due to its risk of cancer relapse. Thus, tremendous advancements have been made in the past few decades for target-specific cancer therapies. Yet, there is no significant change statistically in the mortality rate, which triggers the immediate need to evaluate the research gap and try to resolve it by finding the root cause of cancer. Cancer stem cells are one of the major causes for cancer relapse due to their self-renewal, multi-lineage differentiation properties, drug-resistant property, etc. Treatments targeting cancer stem cells are very few, and focus has been increasing in this field of research. Our hypothesis is to engineer a targeted delivery system that would selectively target cancer stem cells.



Honors & Awards:

1) 2019: **Dr. Loganathan Rangasamy, DBT Ramalingaswami Re-entry Fellowship, DBT India**
2) 2016: **Dr. Loganathan Rangasamy, Marie Skłodowska-Curie Individual Postdoctoral Fellowship** (H2020-MSCA-IF-2016- European Commission), University of San Pablo CEU, Madrid, Spain
3) 2014: **Dr. Loganathan Rangasamy, Swiss Government Excellence Scholarship for Postdoctoral Fellow,** Switzerland

Research group:

Current Members:

Dhanashree Murugan- 19PHD0027

Ph.D. Research Scholar,

Centre for Biomaterials, Cellular, and Molecular Theranostics,
Vellore Institute of Technology,
Vellore-632014.
dhanashree.murugan2019@vitstudent.ac.in

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Thesis Title: Targeted RNAi based gene silencing therapeutics: Exploring the synergy between targeting ligands and cell penetrating peptide.

Dhanashree Murugan is a Ph.D. scholar at Vellore Institute of Technology (VIT). She had completed her Master's and Bachelor's in Biotechnology from SIES College of Arts, Science, and Commerce, Mumbai. She also has experience in working in areas like molecular biology and biophysical studies on proteins. She has been actively associated with the "Drug Discovery Unit (DDU)" since its birth in the Centre for Biomaterials, Cellular, and Molecular Theranostics (CBCMT) at VIT. Her area of research is based on "Designing and synthesizing Cancer stem cell-targeted drug for cancer". Her long-time goal is to translate her research into a marketable product that could be helpful for the welfare of society. She is also passionate about focusing her research on the fabrication of cancer-on-chip, which could be a platform for synthesizing personalized medicine based on the patient's cancer cells and immune status.

Harashkumar V T-20PHD0444

Ph.D. Research Scholar

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harashkumar.vt2020@vitstudent.ac.in

Mobile No: +91 9751801726

Thesis title: Small molecules based theranostic agents for cancer

Harash was born and grew up in the city of Dollar & Textile, Tiruppur, Tamilnadu, India. He completed his post-graduation in chemistry at Chikkanna government arts college (Affiliated to Bharathiar University, Coimbatore). During his post-graduation, he worked as a part-time Technical analyst in the Chemical Section of the Azo textile testing laboratory, Tiruppur. Now he has started his Ph.D. research work in the Centre for Biomaterials Cellular and Molecular Theranostics, Vellore Institute of Technology. His research work focuses on the development of small-molecule theranostic agents for cancer. He is very passionate about playing football, volleyball, and cricket. During his postgraduation, he worked as a part-time Technical analyst in the Chemical Section of the Azo textile testing laboratory, Tiruppur.

Capstone project Student:

RISHIKA S
20MSH0003
MSc Chemistry

Project Title: Design, synthesis and biological evaluation of novel dual parp1/hdac1 inhibitors.

VIGNESH A
20MSH0059
MSc Chemistry

Project Title: Design, synthesis of mitochondria targeting photosensitizer for photodynamic therapy.

Projects ongoing/submitted:

Sl. No.	Title of the project	Sanction No.	Total cost	Agency	Present status	Role (PI/ CI)
1	'Targeted miRNA Based Gene Silencing Therapeutics: Exploiting the Synergy between Targeting Ligands and Cell-Penetrating Peptides'	DBT Ramalingaswami Re-entry Fellowship D.O. NO. BT/HRD/35/02/2006 dated 17th May 2019	113.60 lakhs	Department of Biotechnology	On-going 2020-2025	PI
2	Ligand Targeted PROTAC Conjugates: Chemically Induced Degradation of Disease-causing Kinases by a PROteolysis TArgeting Chimera's (PROTACs) Coupled with Tumor Targeting Ligands	File Number : CRG/2020/001213	36 lakhs	DST-SERB-Core Research Grant	On-going 2020-2023	PI
3	Radiolabeled Fibroblast Activation Protein Inhibitors as Novel Radiopharmaceuticals Targeting CAFs	File number: 2021_06_HLC_14_RP_06862-BRNS date: 30.06.2021	44.49 lakhs	BRNS Coordinated Research Project (CRP)	Recommended on 11.03.2022	PI

Publications

Publications from Vellore Institute of Technology (VIT), Vellore

1. *3D printed Bioactive glass Polymer composites for Bone Tissue Engineering: A short perspective* (**2022**), D. Amey., M. Dhanashree, A. N. J Nathanael, R. Loganathan, O. Taehwan, ***Polymers,*** 2022, 14, 1627. https://doi.org/10.3390/polym14081627 (Impact Factor 4.329)
2. Water-soluble and potent collagenase inhibitor decreases MMP13 activity in human osteosarcoma cells **(2021)**, Z. M. Jose, A. Lourdes, P. Myriam, R. Loganathan, M. C. Laura, C. . Claire, O. Irene, S. N. Maria, P.C. Leonor, P.L. Antonio, M. M. Alejandro, R. Pilar, P,T. Beatriz, R. Ana , ***International Journal of Molecular Sciences***, 2021, 22, 9976. https://doi.org/10.3390/ijms22189976 (Impact Factor 5.923)

Publications from Postdoctoral Research Works

3. *Synthesis and biological evaluation of metallocene-tethered peptidyl inhibitors of CDC25* **(2021),** R. Saonli, **R. Loganathan**, N. Assia, K. Christiane, P. Vanessa, K. Simon, F. Stefano, P. Malay, G. Gilles. ***Organometallics,*** 2021, 40, 15, 2716–2723 (https://doi.org/10.1021/acs.organomet.1c00345) (Impact Factor 3.876)

4. *New Dual CK2/HDAC1 Inhibitors with Nanomolar Inhibitory Activity against Both Enzymes* (**2020**), **R. Loganathan**, O. Ortín, Z. José María, C. Claire, R. Ana and P-T. Beatriz, **ACS Medicinal Chemistry Letters**, 11, 5, 713–719 https://dx.doi.org/10.1021/acsmedchemlett.9b00561 (Impact Factor 4.345)
5. *Enhancing microRNA activity through increased endosomal release mediated by nigericin* (**2019**), E. A. Orellana, A. M Abdelaal, **R. Loganathan**, S. Tenneti, S. Myoung, P. S. Low, and A. L. Kasinski, **Molecular Therapy - Nucleic Acids,** 16, 505-518 https://doi.org/10.1016/j.omtn.2019.04.003 (Impact Factor 8.886, Cover page)
6. *Molecular Imaging Probes based on Matrix Metalloproteinase Inhibitors (MMPIs)* (**2019**), **R. Loganathan**, D. G. Bruno, O. Irene, C. Claire, J. M. Zapico, A. Ramos and B. Pascual-Teresa, **Molecules,** 24, 2982. https://doi.org/10.3390/molecules24162982 (Impact Factor 4.411)
7. *New mechanism for release of endosomal contents: osmotic lysis via nigericin-mediated* K^+/H^+ *exchange* (**2018**), **R. Loganathan**, V. Chelvam, K. Ananda Kumar, S. Madduri, B. Achini, Y. Fei, O. A. Esteban, A. L. Kasinski and P. S. Low, **Bioconjugate Chem.,** 29, 1047-1059. https://doi.org/10.1021/acs.bioconjchem.7b00714 (Impact Factor 4.774)
8. *FolamiRs: Ligand-targeted, vehicle-free delivery of microRNAs for the treatment of cancer* (**2017**), E. A. Orellana, S. Tenneti, **R. Loganathan**, L T Lyle, P. S. Low, and A. L. Kasinski, **Science Translational Medicine,** 9 (401), eaam9327. http://dx.doi.org/10.1126/scitranslmed.aam9327 (Impact Factor 17.956)

Publications from Ph.D. Research Works

9. *DNA Binding and Double-strand DNA Cleavage and Protein Binding and Antiproliferative Activity of Mixed Ligand Copper(II) Complexes of Antibacterial Drug Nalidixic Acid* (**2017**), **R. Loganathan,** M. Ganeshpandian, N. Bhuvanesh, M. Palaniandavar, A. Riyasdeen, M. A. Akbarsha, **J. Inorg. Biochem,** 174, 1-13. http://dx.doi.org/10.1016/j.jinorgbio.2017.05.001 (Impact Factor 4.155)
10. *Water soluble Ru (II)–arene complexes of the antidiabetic drug metformin: DNA and protein binding, molecular docking, cytotoxicity and apoptosis-inducing activity* (**2017**), D. Gopalakrishnan, M. Ganeshpandian, R. Loganathan, N. S. P Bhuvanesh, X. J. Sabina, J Karthikeyan, **RSC Advances,** 7 (60), 37706-37719. http://dx.doi.org/10.1039/C7RA06514K (Impact Factor 3.361)
11. *Organometallic Derivatisation of the Nematocidal Drug Monepantel Leads to Promising Antiparasitic Drug Candidates* (**2016**), H. Jeannine, P. Malay, **R. Loganathan**, K. Sandro, B. Olivier, J. Abdul, M. Patrick, M. J. Erik, B. G. Robin B, and G. Gilles, **Chemistry-A European Journal,** 22 (46), 16602-16612. http://dx.doi.org/10.1002/chem.201602851 (Impact Factor 5.236)
12. *Synthesis, Characterization and Biological Evaluation of novel Ru(II) Arene Complexes containing intercalating Ligands* (**2015***)* **R. Loganathan**,# S. Nikolić,# N. Gligorijević, S. Aranđelović, S. Radulović, G. Gasser and S. Grgurić-Šipka, **J. Inorg. Biochem,** 2015, 160, 156-165. http://dx.doi.org/10.1016/j.jinorgbio.2016.01.005 #These authors equally contributed. (Impact Factor 3.361)
13. *Mixed Ligand Copper(II) Dicarboxylate Complexes: Role of Co-ligand on DNA Binding and Double-strand DNA Cleavage and on Protein Binding and Cytotoxicity* (**2015**), **R. Loganathan,** S. Ramakrishnan, M. Ganeshpandian, N. Bhuvanesh, M. Palaniandavar, A. Riyasdeen, M. A. Akbarsha, **Dalton Trans**, 2015, 44, 10210-10227. http://dx.doi.org/10.1039/c4dt03879g (Impact Factor 4.390)
14. *Mixed Ligand μ-Phenoxo-bridged Dinuclear Copper(II) Complexes with Diimine Co- ligands:*

Efficient Chemical Nuclease and Protease Activities and Cytotoxicity (**2014**) **R. Loganathan**, S. Ramakrishnan. E. Suresh, A. Riyasdeen, M. A. Akbarsha, and M. Palaniandavar, **Dalton Trans**, 2014, *43*, 16, 6177-6194. http://dx.doi.org/10.1039/c3dt52518j (Impact Factor 4.390)

15. *New ruthenium(II) arene complexes of anthracenyl appended diazacycloalkanes: effect of ligand intercalation and hydrophobicity on DNA and protein binding and cleavage and cytotoxicity* (**2014**), M. Ganeshpandian, **R. Loganathan**, S. Ramakrishnan, A. Riyasdeen, M. A. Akbarsha, M. Palaniandavar, **Dalton Trans**, 2014, *43*, 1203 – 1219. http://dx.doi.org/10.1039/c3dt51641e. (Impact Factor 4.390)
16. *Copper(II) Complexes with 2NO and 3N donor Ligands: Synthesis, Structures and Chemical Nuclease and Anticancer Activities* (**2013**), C. Rajarajeswari, **R. Loganathan**, M. Palaniandavar, E. Suresh, A. Riyasdeen and M. A. Akbarsha, **Dalton Trans**, 2013, *42*, 8347– 8363. http://dx.doi.org/10.1039/c3dt32992e. (Impact Factor 4.390)
17. *Interaction of Mixed Ligand Copper(II) Complexes with CT DNA and BSA: Effect of Primary Ligand Hydrophobicity on DNA and protein Binding and Cleavage and Anticancer activities* (**2013**) M. Ganeshpandian, **R. Loganathan**, S. Ramakrishnan, A. Riyasdeen, M. A. Akbarsha, M. Palaniandavar, **Polyhedron**, 2013, *52*, 929 - 938. http://dx.doi.org/10.1016/j.poly.2012.07.021 (Most cited article 2013-2014) (Impact Factor 3.052)
18. *Mixed Ligand Copper(II) Complexes of N,N-Bis(benzimidazol-2-ylmethyl)amine (BBA) with Diimine Co-ligands: Efficient Chemical Nuclease and Protease Activities and Cytotoxicity* (**2012**), **R. Loganathan**, S Ramakrishnan, E. Suresh, A. Riyasdeen, M. A. Akbarsha, M. Palaniandavar, **Inorg. Chem**, 2012, *51*, 5512−5532. http://dx.doi.org/10.1021/ic2017177 (Impact Factor 5.165)
19. *Interaction of Copper(II) Complexes with Bis(p-nitrophenyl)phosphate: Structural and Spectral Studies* (**2011**), T. Dhanalakshmi, **R. Loganathan**, E. Suresh b, H. Stoeckli-Evans, M. Palaniandavar, **Inorg. Chim. Acta**, 2011, *372*, 237–242 http://dx.doi.org/10.1016/j.ica.2011.02.030 (Impact Factor 2.545)

Book Chapter:

From Vellore Institute of Technology (VIT), Vellore

1. **Book Chapter:** 3D Printing Technology for Fighting COVID-19 Pandemic, Book Name: Emerging Applications of 3D Printing During CoVID 19 Pandemic pp 81-109, Rohin Shyam, Pearlin Hameed. Suya Prem Anand, Loganathan Rangasamy, Arunkumar Palaniappan, Geetha Manivasagam (**2022**), ISBN: 978-981-33-6702-9, https://doi.org/10.1007/978-981-33-6703-6_5, Springer, Singapore

Publications from Ph.D. Research Work

2. **Book Chapter**: *Novel Coordination Complexes of a Few Essential Trace Metals: Cytotoxic Properties and Lead Identification for Drug Development for Cancer*, Chapter 11, **Book Name**: *Perspectives in Cancer Prevention-Translational Cancer Research*, A. Riyasdeen, **R. Loganathan**, M. Palaniandavar, and M.A. Akbarsha (**2013**) **ISBN** 978-81-322- 1533-2, 133-143. https://doi.org/10.1007/978-81-322-1533-2_11, Springer India

International Patent from Postdoctoral Research Work

1. Low, Philip Stewart; Kasinski, Andrea L.; **Rangasamy, Loganathan**; Ligand Ionophore Conjugates. Patent number: WO 2018/094035 A2; International application No.: PCT/US2017/061997, Filed: 16.11.2017; Date of Patent:24.05.2018. (https://patentscope.wipo.int/search/en/detail.jsf?docId=WO2018094035&tab=PCTBIBLIO)

Invites talks & outreach programs:

1. Delivered 2 h Guest lecture for Master students on Drug Discovery program offered by University of San Pablo CEU, Madrid, Spain, Dec 16, 2020

2. Delivered invited talk https://mrs.digitellinc.com/mrs/sessions/32299/view Materials Science for COVID-19: A Global Discussion Between Scientists Nov 11, 2020 8:00am - Nov 11, 2020 9:30am

3. Delivered invited talk in International Webinar of Developing Biomaterails for the fight against COVID-19 organized by the Chinese Society For Biomaterials and US Society For Biomaterial, November 8, 2020

4. Delivered a talk on 'Coronavirus treatments, challenges, and opportunities' at Einstein College of Arts and science, Tirunelveli on August 01, 2020

5. Resource person for the five days Faculty Development Programme on "Challenging role of Chemistry in Drug design and Development" (CCDD – 2K20) organized by Department of Chemistry and Institution's Innovation Council (IIC), K S Rangasamy College of Technology, Tiruchengode. Namakkal (Dt.), Tamilnadu, India on August 08, 2020

6. Delivered a webinar on 'In search of Coronavirus Treatments: Challenges and Opportunities' at Nehru Institute of Engineering and Technology – Coimbatore on July 24, 2020

7. Delivered webinar on 'In search for coronavirus treatments: challenges and opportunities' at PSG College of Arts and Science, Coimbatore on May 21, 2020

8. Delivered a webinar on 'Developments of therapeutics and vaccines for covid-19' at Sri Ramakrishna College of Arts and Science, Coimbatore on May 12, 2020

9. Delivered a webinar on 'Coronavirus Research - Drugs and Diagnostics' at Bannari Amman Institute of Technology, Erode, Tamil Nadu on May 09, 2020

Convenor

1. Indo-UK Virtual Conference 'Current Innovations and the Future of Therapeutic Developments (CIFTD-2020)' at CBCMT, VIT from June 1-3, 2020.

2. As a Academic Staff College Coordinator, CBCMT, we organized Faculty Development Programme on ''Building Academic Entrepreneurship and Start-ups: Basic Scientist's, Clinician's and Entrepreneur's Perspectives'' Dec 14- 18, 2020 - 10.00 am to 6.00 pm.

3. Faculty Coordinator - a series of BU-VIT joint biomedical science and engineering seminars in association with Centre for Biomaterials Cellular and Molecular Theranostics (CBCMT) , Vellore Institute of Technology (VIT), Vellore, Tami Nadu, India, and Department of Biomedical Engineering, Center of Biomanufacturing for Regenerative Medicine (CBRM) Thomas J. Watson College of Engineering and Applied Science, Binghamton University, Binghamton, NY USA, Dec 03, 2020 to Feb 02, 2021

4. Organized an invited lecture for CBCMT's Crazy, Curious and Creative -C3 Club meeting Speaker: Dr. Rajapandian Panneerselvam, University of Leipzig, Germany, Topic: "Applications of Microfluidics in Chemistry and Biology"
Venue- MS Teams: C3 CLUB, Timing- 12:15 pm to 1:15 pm

5. Organized Foreign Expert Guest Lecture by Dr. Saravanan Ramasamy, Saravanan Ramasamy, Ph.D. Assistant Professor, Department of Chemistry and Biochemistry, Angelo State University, Member, Texas Tech University System, San Angelo, TX 76909-0892 on 18 Jan 2021

Interview in Media

1) Live Interview with Dr. Loganathan Rangasamy on 'Corona Virus and Medicines' in Kalainar TV from 2.30 PM to 3.00 PM April 16, 2020 (https://www.youtube.com/watch?v=oMAqLqupN2E&feature=youtu.be)

Additional Details

JRF ongoing:

Name: Dhanashree Murugan,

Duration: 2020-2023

PI: Dr. Loganathan Rangasamy

Project title: Targeted RNAi based gene silencing therapeutics: Exploring the synergy between targeting ligands and cell penetrating peptide.

Capstone Project ongoing:

1) Title- Design, synthesis and biological evaluation of novel dual parp1/hdac1 inhibitors, Duration: January 2022- May 2022, PI-Dr. Loganathan Rangasamy)
2) Title- Design, synthesis of mitochondria targeting photosensitizer for photodynamic therapy, Duration: January 2022- May 2022, PI-Dr. Loganathan Rangasamy)