

Dr. ARAVIND KUMAR RENGAN

Dr. Aravind Kumar Rengan M.B.B.S, Master of Nanomedicine, PhD (IITB),
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EDUCATION

Degree	University	Year	CGPA/%
Ph.D. -BME	IIT Bombay, Powai, Mumbai	2015	9.63/10 (Best Thesis Award)
M. Tech Nanomedicine	Amrita Centre for Nanosciences and Molecular Medicine	2010	9.39/10 (University Rank)
M.B.B.S	Tamilnadu Dr. M.G.R Govt. Medical University	2007	First Class
Intermediate/+2	Tamilnadu State Board	2001	95.25
Matriculation/10 th	Tamilnadu Matric Board	1999	91.72

Professional Experience

Position	University/ Institution	Dates
Associate Professor	IIT Hyderabad	Oct 13 th 2021 - Till Date

Assistant Professor	IIT Hyderabad	Aug 12 th 2015 – Oct 11 th 2021
Research Associate	IIT Bombay	Nov 1 st 2014-July 31 st 2015
Teaching Assistant under Project	IIT Bombay	May 1 st 2013-Oct 31 st 2014
Institute Teaching Assistant	IIT Bombay	July 15 th 2010-April 30 th 2013
CRRI (House Surgeon)	Thanjavur medical college	Mar 31 2006 –Mar 30 th 2007

AWARDS /HONOURS/FELLOWSHIPS

- **Selected to the BRICS - Young Scientist Forum 2021 (One among 5 scientists representing India in the Healthcare Domain)**
- **INDIAN NATIONAL ACADEMY OF ENGINEERING (INAE) – Young Engineer Awardee 2018 - Certificate + Cash award. Inducted into INAE as Young Associate till 2028.**
- **Selected for INDIAN NATIONAL YOUNG ACADEMY OF SCIENCE (INYNAS) Membership, 2020-2024.**
- **NATIONAL ACADEMY OF SCIENCE (NASI) – Young Scientist Awardee 2018 - Medal+ Certificate + Cash award**
- **INDIAN NATIONAL SCIENCE ACADEMY (INSA) – Young Scientist Awardee 2017- Medal+ Certificate + Startup Grant**
- **Student team selected for President of India “Innovation Scholars In-Residence Program” for “Affordable kit for detection of Cervical Cancer”**
- **DBT- BIRAC- Gandhian Young Technology Innovation Award 2017 – Certificate + Grant.**
- **INNOVATIVE YOUNG BIOTECHNOLOGIST AWARD IYBA (2015-16) presented by GOVERNMENT OF INDIA - DBT.**
- **DST INSPIRE FACULTY AWARD 2015 – (BIOMEDICAL)**
- **Gandhian Young Technology Innovation Award Winner 2015 – Presented at President’s House, Rastrapathi Bhavan (Festival of Innovation 2015) – March 8th 2015.**
- **IIT Bombay Institute’s Award for Excellence in PhD - (2014-16) - Cash Prize and Merit Certificate**

- **Lion Pushpa Somaiya Student Award 2015 – Cash Prize and Trophy**
- **IRCC - Infosys Fellowship - “OraNano C (Oral Cancer therapeutics)” project (2014-2015).**
- **Bill and Melinda Gates Fellowship -“TB NANODOTS” project – served as Co-investigator/project in-charge with a fellowship (2013-2014).**
- IIT B Teaching Assistant – **Institute fellowship (2010-2013)**
- **DST fellowship** for Master of Nanomedical Sciences (2008-2010)
- **University Rank Holder** in M.Tech Nanomedicine (**Merit certificate + Medal**).
- **DBT-IITB travel award** to visit UK for oral presentation in 2012, IEEE NANO.
- **IKP-GCE travel award** to visit Brazil for poster presentation in 2013, GCE- Annual meet, Rio, Brazil.
- **Top 100 winner of ICONSAT 2014** poster presentation (**Top 15** under nanomedicine category).
- **Top 16 winner of Travel grant award** “Nanomed Engineering Workshop” **AIIMS Delhi** organized by Indo US Science and Technology Form (**IUSSTF**).
- **Best Poster Award**, Indo-US Nanoengineering in Medicine Conference, AIIMS Delhi, Dec 2014.
- **Best Paper - Bajpai Saha Award**, Society for Biomaterials and Artificial Organs, **BiTERM** conference, Anna University – Chennai, Feb,2015.
- **Best Poster Award-** International Symposium on Nanotechnology and Cancer Theranostics - **ISNACT** –IIT Bombay, Feb 2015.
- **Best Oral Presentation** – In House Symposium, Dept. of Biosciences and Bioengineering, RESCON, IIT Bombay, March 2015.
- **Best Poster Award – SymPhy2015, IIT Bombay.**
- **Best Poster Award – GE IDEA/Research Poster contest, 2015.**
- Obtained “STAR PERFORMER – **GOLD CERTIFICATE**” from TOEFL, ETS org. for scoring above 27/30 in each section of TOEFL iBT and above 110/120 overall.
- Cleared the Tamilnadu state entrance in 2001 to obtain merit seat for MBBS studies.
- One among 15 medical doctors who cleared **MMST** (masters in medical science and technology) entrance in 2008 conducted by IIT-Kharagpur.

Dr. Aravind's Student team awards/Honours

- **Best Poster Presentation – Anil Jogdand & Aravind Kumar Rengan**, Mucoadhesive Nanomaterial for photothermal therapy in biomedical applications. International Conference on Recent Trends in 2D Nanomaterials: Synthesis, Properties and Applications: A virtual Event 2D Nano Mat-2021. AMITY University, Mumbai.
- **Syed Alvi**- selected for **Research Excellence Award 2020** –presented during Foundation Day of IITH (Aug 30, 2020).
- **Tejaswini Appidi** selected for **Newton Bhabha Fellowship** at University of Nottingham: Collaborative Project between AKR (IITH) & Dr. George Gordon.
- **Best Poster Presentation - Rajalakshmi P.S & Aravind Kumar Rengan**, Plant derived fluorescent lipid nanoparticles for the photothermal/Photodynamic therapies. International conference of Nutraceuticals and Chronic diseases INCD 2019, IIT- Guwahati
- **Best Paper Award- Deepak Bharadwaj Pemmaraju., Tejaswini Appidi and Aravind Kumar Rengan**. Photothermal therapy assisted Bioactive nanoprobe for effective cancer theranostics. **IEEE International E-Health and Bioengineering, 2019, Romania**.
- Syed Baseeruddin Alvi., Shivangi Paradkar, Arpan Pradhan, Rohit Srivastava and **Aravind Kumar Rengan**. Timing the therapeutic trigger of Lipos Cur NPs for effective Photothermal therapy. **IEEE Nanomed International conference, 2019, South Korea**.
- **Best Poster Award-T. Appidi, R. Srivastava and A.K. Rengan**. Optical properties of plasmonic Gold- An application for diagnosis of Cervical cancer. **14th IEEE Nanotechnology Materials and Devices Conference, 2019, Stockholm, Sweden**.

▪ Sponsored Projects

The Lab is well funded with Projects Sponsored by MoE, DBT, ICMR and DST.

Courses taught at IIT Hyderabad

Fall Semester : 1. Physiology for Engineers.

2. Bio-nanotechnology.

Spring Semester : 1. Nanomedicine.

2. Clinical Immersion in BME.

3. Healthcare.

SCIENTIFIC EXPERTISE/ TECHNICAL SKILLS

PhD Thesis: “Liposome gold nanoparticles for photothermal therapy of cancer”. Guides: Prof. Rohit Srivastava and Prof. Rinti Banerjee (IIT Bombay) in collaboration with Dr. Abhijit De (ACTREC-TMH).

M.Tech Thesis: “In Vivo bio-distribution analysis of NIR Dye conjugated protein nanoparticles in small animal model” Guides - Prof. Manzoor.K & Dr. Ullas Mony (ACNSMM)

One-year clinical internship training in the branches of medicine, surgery, community medicine and obstetrics & gynaecology. **I am a registered medical practitioner with MCI registration no: 81367.**

SCIENTIFIC PUBLICATIONS & PROCEEDINGS

- PS R, Alvi SB, Begum N, Veeresh B, **Rengan AK@**. Self-Assembled Fluorosome-Polydopamine Complex for Efficient Tumor Targeting and Commingled Photodynamic/Photothermal Therapy of Triple-Negative Breast Cancer. *Biomacromolecules*. 2021 Aug 12;22(9):3926-40.
- Angeline P, Thomas A, Sankaranarayanan S A, **Rengan AK@**. Effect of pH on Isoliquiritigenin (ISL) fluorescence in lipo- polymeric system and metallic nanosystem. *Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy*. 2021: 119545
- Das P, Mudigunda S V, Darabdhara G, Boruah P K, Ghar S, **Rengan AK@**, Das M R. Biocompatible functionalized AuPd bimetallic nanoparticles decorated on reduced graphene oxide sheets for photothermal therapy of targeted cancer cells. *Journal of Photochemistry and Photobiology B: Biology*. 2020, 112028.
- Alvi S B, Rajalakshmi P S, Jogdand A, Sanjay A Y, Veeresh B, John R and **Rengan AK@**. Iontophoresis mediated localized delivery of liposomal gold nanoparticles for photothermal and photodynamic therapy of acne. *RSC Biomaterials Science*. 2021, 9, 1421.
- Jogdand A, Alvi SB, Rajalakshmi P, **Rengan AK@**. NIR-dye based mucoadhesive nanosystem for photothermal therapy in breast cancer cells. *Journal of Photochemistry and Photobiology B: Biology*. 2020, 111901.
- Revi, N., and **Rengan, AK@**. Eugenol-Encapsulated Nanocarriers for Microglial Polarisation: a Promising Therapeutic Application for Neuroprotection. *BioNanoScience*. 2020, 10,1010–1017
- Appidi T, Mudigunda S V, Kodandapani S. and **Rengan AK@**. Development of label-free gold nanoparticle based rapid colorimetric assay for clinical/point-of-care screening of cervical cancer. *RSC Nanoscale Advances*. 2020,2, 5737-5745
- Gudimella K K, Appidi T, Wu H F, Battula V, Jogdand A, **Rengan AK,@** Gedda G. Sand bath assisted green synthesis of carbon dots from citrus fruit peels for free radical scavenging and cell imaging. *Colloids and Surfaces B: Biointerfaces*. 2021, 111362.

- Hak A, Shinde V R, **Rengan, AK@**. A review of advanced nanoformulations in phototherapy for cancer therapeutics, *Photodiagnosis and Photodynamic Therapy*. 2021.102205
- Ravichandran G, and **Rengan AK@**. Aptamer-Mediated Nanotheranostics for Cancer Treatment: A Review. *ACS Applied Nano Materials*. 2020, 3, 10, 9542–9559
- Thomas A, Appidi T, Jogdand AB, Ghar S, Subramaniam K, Prabusankar G, **Rengan AK@**. Facile Synthesis of Fluorescent Polymer Encapsulated Metal (PoeM) Nanoparticles for Imaging and Therapeutic Applications. *ACS Applied Polymer Materials*. 2020;2(3):1388-97.
- Appidi T, Pemmaraju DB, Khan RA, Alvi SB, Srivastava R, Pal M, **Rengan AK@**. Light-triggered selective ROS-dependent autophagy by bioactive nanoliposomes for efficient cancer theranostics. *Nanoscale*. 2020;12(3):2028-39.
- Alvi SB, Appidi T, Deepak BP, Rajalakshmi P, Minhas G, Singh SP, **Rengan AK@**. The “nano to micro” transition of hydrophobic curcumin crystals leading to in situ adjuvant depots for Au-liposome nanoparticle mediated enhanced photothermal therapy. *Biomaterials science*. 2019;7(9):3866-75.
- Appidi T, Srivastava R, **Rengan AK@**, editors. Optical Properties of Plasmonic Gold: A Possible Application for Screening of Cervical Cancer. *2019 IEEE 14th Nanotechnology Materials and Devices Conference (NMDC)*; 2019: IEEE.
- Alvi SB, Paradkar S, Pradhan A, Srivastava R, **Rengan AK@**. Timing The Therapeutic Trigger of Au Lipos Cur NPs for Effective Photothermal Therapy. *2019 IEEE 13th International Conference on Nano/Molecular Medicine & Engineering (NANOMED)*; 2019: IEEE.
- Pemmaraju DB, Appidi T, **Rengan AK@**. Photothermal therapy assisted bioactive nanoprobes for effective cancer theranostics. 2019 - IEEE EMB.
- Banerjee K, Alvi SB, **Rengan AK**, Asthana S. Investigation on the discharge energy storage density of the Rb substituted Na_{0.5}Bi_{0.5}TiO₃ relaxor ferroelectric and its suitability for the orthopedic application. *Journal of the American Ceramic Society*. 2019;102(11):6802-16.
- Chauhan DS, Bukhari AB, Ravichandran G, Gupta R, George L, Poojari R, Ingle A, **Rengan AK**, Shanavas A, et.al. Enhanced EPR directed and Imaging guided Photothermal Therapy using Vitamin E Modified Toco-Photoxil. *Scientific reports*. 2018;8(1):16673.
- Pemmaraju D, Appidi T, Minhas G, Singh SP, Khan N, Pal M, **Rengan AK@**. Chlorophyll rich biomolecular fraction of *A. cadamba* loaded into polymeric nanosystem coupled with Photothermal Therapy: A synergistic approach for cancer theranostics. *Int J Biol Macromol*. 2018;110:383-91.

- Singh SP, Alvi SB, Bharadwaj D, Singh AD, Manda SV, Srivastava R, **Rengan AK@**. NIR triggered liposome gold nanoparticles entrapping curcumin as in situ adjuvant for photothermal treatment of skin cancer. *Int J Biol Macromol*. 2018;110:375-82.
- Shanavas A*@, **Rengan AK*@**, Chauhan D, George L, Vats M, Kaur N, et al. Glycol chitosan assisted in situ reduction of gold on polymeric template for anti-cancer theranostics. *Int J Biol Macromol*. 2018;110:392-8.
- Yadav P, Singh SP, **Rengan AK**, Shanavas A, Srivastava R. Gold laced bio-macromolecules for theranostic application. *Int J Biol Macromol*. 2018;110:39-53.
- Darabdhara G, Das MR, Singh SP, **Rengan AK@**, Szunerits S, Boukherroub R. Ag and Au nanoparticles/reduced graphene oxide composite materials: Synthesis and application in diagnostics and therapeutics. *Adv Colloid Interface Sci*. 2019;271:101991.
- **Rengan AK***, Bukhari AB*, Pradhan A, Malhotra R, Banerjee R, Srivastava R, et al. In vivo analysis of biodegradable liposome gold nanoparticles as efficient agents for photothermal therapy of cancer. *Nano Lett*. 2015;15(2):842-8.
- **Rengan AK**, Jagtap M, De A, Banerjee R, Srivastava R. Multifunctional gold coated thermo-sensitive liposomes for multimodal imaging and photo-thermal therapy of breast cancer cells. *Nanoscale*. 2014;6(2):916-23.
- **Rengan AK**, Kundu G, Banerjee R, Srivastava R. Gold nanocages as effective photothermal transducers in killing highly tumorigenic cancer cells. *Particle & Particle Systems Characterization*. 2014;31(3):398-405.
- Byagari K*, Shanavas A*, **Rengan AK***, Kundu G, Srivastava R. Biocompatible amphiphilic pentablock copolymeric nanoparticles for anti-cancer drug delivery. *Journal of Biomedical Nanotechnology*. 2014;10(1):109-19.
- **Rengan AK**, Banerjee R, Srivastava R, editors. Thermosensitive gold-liposome hybrid nanostructures for photothermal therapy of cancer. *IEEE-NANO*, 2012 12th IEEE Conference on Nano; 2012: IEEE.

(* Equal Contribution, @ Corresponding Author)

PATENTS

- **Modified PEG-400 (mPEG-AA complex) and uses thereof.** IPA No 4134/CHE/2021
- **Thermosensitive hydrogel for cancer therapeutic and methods of preparation thereof** IPA No 23367/CHE/2020.
- **Ferroelectric polymer (pvdf) for control and mitigation of microbes under small voltage signals.** IPA No 050666/CHE/2020

- **Hybrid polymeric nanoformulation for the treatment and management of retinoblastoma.** IPA No 2141/CHE/2020
- **Plant derived fluorescent nanoparticles for treatment of cancer,** IPA no. 030649/CHE/2019.
- **Fluorescent polyethylene glycol** IPA No. 030149/CHE/2018.
- **Fluorescent polymeric NPs as imaging probe.** IPA No. 032865/CHE/2018
- **Liposomal nanoformulations for treatment of cancer** IPA No. 032747/CHE/2018.
- **Detection kit for diagnosis of cervical cancer by quantification of visual inspection of acetic acid** IPA No. 016604/CHE/2018.
- **Photo-disintegrable metal nanoshells for multimodal imaging and passively targeted photothermal therapy of cancer** IPA No. 4082/Mum/2015;
- **Liponion as a multi-colour fluorescent biolabelling probe.** IPA No. 2368/Mum/2015;
- **Worldwide patent, PCT Application no. PCT/IN2016/000296** - Claiming priority from IPA no. 4910/MUM/2015.
- **Enzymatically degradable Lipos Au Nanoparticles for Cancer Theranostics** - IPA No. 4910/MUM/2015;

▪ Dr. ARAVIND's RESEARCH WORK IN THE NEWS

- "Self-Test for Cervical Cancer" The Hindu, dated Nov 4th 2017. <http://www.thehindu.com/sci-tech/health/a-self-test-for-cervical-cancer/article19982985.ece>
- "Plant extract with NIR dye for photothermal therapy of Skin Cancer" – The Hindu, dated Oct 21 2017. <http://www.thehindu.com/sci-tech/science/iit-teams-use-plant-extract-heat-to-kill-skin-cancer-cells/article19896355.ece>
- "Brachistochrone: A metaphor for life and science" Indiabioscience Interview dated March 7th, 2017. <https://indiabioscience.org/columns/indiabioscience-blog/brachistochrone-a-metaphor-for-life-and-science>
- "Nano Biologist Hyderabad IIT wins IYBA Award" Biostandups Interview dated Nov 17th, 2016. <http://www.biostandups.com/interview-series/nano-biologist-hyderabad-iit-wins-iyba-award-2015-interview-series/>

- “Medical graduate who chose research and won awards” India Medical Times interview dated Sep 13th, 2016.” <http://www.indiamedicaltimes.com/2016/09/13/interview-dr-aravind-rengan-a-medical-graduate-who-went-into-research-and-won-awards/>
- *In Vivo* Research work mentioned in Nature Index 2015. (Nature Index tracks top quality research work across the world)
- “Innovation in Cancer Therapeutic NDTV interview” dated Jan 24th, 2015. <http://www.ndtv.com/video/player/ndtv-special-ndtv-india/health4u-how-to-fight-cancer/353803> (between 10.40 to 13.30 mins).
- IITB ‘s LipoAu Nanoparticles for Cancer therapeutics “The Indian Express” dated – 7th Sep,2014 . <http://epaper.indianexpress.com/c/3447102>
- “Healing touch of gold” – IIT Bombay’s official website showcases our research work. <http://www.iitb.ac.in/en/research-highlight/healing-touch-gold>
- TB Nanodots work (Bill Gates fellowship) “Hindustan Times” dated – June 09, 2013. <http://www.hindustantimes.com/mumbai/iit-b-making-tb-patch-that-works-with-sunlight/article1-1073345.aspx>

Invited Talks/ Guest Lectures

- **“Cancer Theranostics: Role of Organo-Inorganic hybrid nanosystems”** – Invited Talk – ICITE 2018- Osmania University – **April 13th 2018.**
- **“Switching on Light to induce Darkness within Cancer cells”** – Invited Talk Golden Jubilee Seminar, University of Calicut **March 16th 2018.**
- **“Nanomaterials as Drugs” CCMB – Invited Talk at CSIR Training Program – Invited Talk – Feb 28th 2018.**
- **“Bio-Nanomaterials: Choosing the right nanosystem for drug delivery and theranostic application!”** Thiagarajar Engineering College: Guest Lecture – **Dec 18th 2017.**
- **“In Vitro & In Vivo Analysis of Bio-Degradable and Disintegrable Nanosystems for cancer theranostics”**- invited talk Indo-UK IISER Kolkatta Workshop – **Dec 15th 2017.**

- **“Metallic Nanomedicine: A Novel Prospectus In Cancer Theranostics”** Indo-UK Kanpur Workshop – Invited YI talk – **8th Nov 2017**.
- **“The Road Less Taken – Brachistochrone in Biomedical Research ?!”** – India Bioscience, DBT - Wellcome Trust India Alliance sponsored – Young Investigator’s Meet (YIM 2017), Goa, – YI Talk. **March 6-9th 2017**
- **“Innovation in Pharmaceutics – Nanomedicine- DBT Sponsored Teacher Training Program”** – Malla Reddy College of Pharmacy, Hyderabad, -Invited Lecture. **Nov 25th 2016**.
- **“Nanomedicine – A brave new world in cancer theranostics”** – Innovation in Pharmaceutical Research, National Seminar, G Pulla Reddy College of Pharmacy, Hyderabad, – Guest Lecture. **July 30th 2016**
- **“Organo-Inorganic Hybrid Nanomaterials: Avenues in Cancer Theranostics”** – 6th Actrec Monsoon Retreat, Mumbai, – Invited Talk. **Aug 3rd 2013**.