

Raviraj Vankayala

Associate Professor

Department of Biosciences and Bioengineering

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Secondary Affiliation: Interdisciplinary Research Platform Smart Healthcare



Objective

Seeking a research oriented academic opportunity in an institution, where I can contribute myself to the latest research and development.

Work Experience

- **07/2023 ~ Till date:** Associate Professor, Department of Bioscience and Bioengineering, Indian Institute of Technology Jodhpur, India.
- **01/2020 ~ 06/2023:** Assistant Professor, Department of Bioscience and Bioengineering, Indian Institute of Technology Jodhpur, India.
- **07/2017 ~ 01/2020:** Chief Technology Officer at Radoptics, LLC Irvine CA 92612.
- **07/2017 ~ 01/2020:** Visiting Researcher at Department of Bioengineering, University of California Riverside, USA.
- **08/2015 ~ 07/2017:** Postdoctoral Research Fellow, Department of Bioengineering, Bourns College, University of California, Riverside, USA. (**Mentor: Prof. Bahman Anvari**)
Project title: *Fabrication of Optical Nanoconstructs derived from plant viruses and red blood cells doped with various near infrared chromophores for imaging and phototherapy of ovarian cancers and port-wine stains.*
- **08/2012 ~ 08/2015:** Postdoctoral Research Fellow, Department of Chemistry, National Tsing Hua University, Taiwan. (**Mentor: Prof. Kuo Chu Hwang**)
Project title: *Nanomaterial-mediated photodynamic therapeutic destruction of tumors.*

Academic Profile

- **09/2007 - 07/2012: Ph.D.,** Department of Chemistry, National Tsing Hua University, Taiwan.
Thesis title: *Multi-functional Nanoparticles for Biomedical Applications.*
Supervisor: Prof. Kuo Chu Hwang
Qualifying examinations cleared during Ph.D.: Analytical Chemistry, 1. Chemical Separation Methods, 2. Instrumentation Techniques.
Courses undertaken: 1. Analytical Techniques for Materials Chemistry, 2. Biomedical Analysis, 3. Nanomaterials Chemistry, 4. Analytical Mass Spectrometry, 5. Transmission electron microscopy.
- **08/2006 - 08/2007: Teaching-cum-Research Assistant** for Undergraduate students at VIT University, India.

Project title: *Removal of Arsenic and Chromium from drinking water and soil/sludge using zero-valent iron nanoparticles.*

- **04/2004 - 04/2006: M. Sc** in Applied Environmental Chemistry, Andhra University, India.
Project title: *Environmental waste management and disposal from petroleum refineries (A short two-month project done at Hindustan Petroleum Corporation Limited, Visakhapatnam).*
- **2001-2004: B. Sc** in Mathematics, Physics and Chemistry from Andhra University, India.

Research Interests: Nanotheranostics, Drug Delivery, Biomaterials

Research Supervision:

PhDs: 05 (Ongoing)

M.Tech. Thesis: 02 (Ongoing); 01 (Completed; as a Co-Supervisor)

Research Grants

S.No.	Project title	Role	Funding Agency	Amount (INR)	Status
1.	Biomimetic Nanoscale Metal Organic Frameworks for Targeted Near Infrared Fluorescence Imaging and Phototherapeutic Destruction of Intraperitoneal Tumors	PI	Dept. of Biotechnology, India	42.5 lakhs	Ongoing
2.	Biomimetic Nanoscale Metal Organic Frameworks for Targeted Bimodal NIRF and MR Imaging and Phototherapy of Ovarian Cancer Cells	PI	IIT Jodhpur SEED Fund	25 lakhs	Ongoing
3.	NIR Light Activatable Erythrocyte Membrane Coated Black Phosphorous Nanosheets for Targeted Bioimaging and Photo-Chemotherapy of Breast Cancer Cells	PI	International Research Mobility Grant, IIT Jodhpur	10 lakhs	Ongoing
4.	Point of use and in-line coliform sensors for smart water management	Co-PI	Ministry of JalShakti, Govt. of India	72.5 lakhs	Ongoing
5.	Biocompatible and water dispersible silanized reduced graphene oxide derivatives: NIR responsive bimodal phototherapeutic agents for the disruption of bacterial biofilms	Co-PI	Dept. of Science & Technology, India	62 lakhs	Ongoing
6.	THAR Designs	Co-PI	JCKIF, IIT Jodhpur	5 lakhs	Ongoing
7.	CoE Ayurtech for Precision Medicine and Health	Co-PI	Ministry of Ayush, Govt. of India	1000 lakhs	Ongoing
8.	Early Diagnosis of Metastatic sites in Cancer Patients	Co-PI	National Project Implementation Unit (NIPU)	17.5 lakhs	Completed
9.	Erythrocyte-derived optical nano-probes for image-guided identification of tumor margins and	PI	NIH-SBIR	200 lakhs	Completed

	cancer resection				
10.	Erythrocyte-derived nanoparticles for light activated combination of chemo-photothermal therapy of tumors	PI	NIH-SBIR	210 lakhs	Completed

Courses Taught

- Selected Topics in Biomaterials Engineering (Graduate Level)
- Biomedical Nanomaterials (Graduate Level)
- Tissue Engineering, Medical Devices and Implants (Graduate Level)
- Theranostic Systems (Graduate Level)
- Cell-Material Interactions (Undergraduate Level)
- Diagnostics and Therapeutics (Graduate Level)
- Introduction to Bioengineering (Undergraduate Level)

Scientific Journal Publications (*Corresponding author)

[50 SCI papers; Total citations = 2978; h-index = 23; Cumulative IF > 400]

*Corresponding author

- 1) Tamal Dey, Netra Hiremath, Vishav Kant, Rakesh K. Sharma, **Raviraj Vankayala**, Saikat Dutta, "Cellular metabolic activity and electrochemical stability assay of embedded oxidoreductase enzyme confined in the nanospace of a framework exoskeleton", *Biomaterials Science*, **2023**, 11, 15, 5136 (IF = 7.5).
- 2) Khushboo Rani¹, Bhumika Pippal¹, Shubham Kumar Singh, Anurupa Karmakar, **Raviraj Vankayala** and Neha Jain* "Effects of Aspect Ratio of Plasmonic Gold Nanorods on the Inhibition of Lysozyme Amyloid Formation", *Biomaterials Science*, **2023**, 11, 15, 4200 (IF = 7.5). ¹Equally contributed
- 3) Shubham Kumar Singh, Sarmistha Mazumder, Antony Vincy, Netra Hiremath, Rahul Kumar, Indranil Banerjee, **Raviraj Vankayala*** "Review of Photoresponsive Plasmonic Nanoparticles that Produce Reactive Chemical Species for Photodynamic Therapy of Cancer and Bacterial Infections", *ACS Applied Nanomaterials* **2023**, 6, 3, 1508 (IF = 6.1).
- 4) Antony Vincy, Nitin Bhatia, **Raviraj Vankayala***, "Optical Characteristics of Indocyanine Green J-Aggregates Induced by Cisplatin for Phototheranostic Applications", *ACS Biomaterials Science & Engineering* **2022**, 8, 12, 5119 (IF = 5.395).
- 5) Jenny T. Mac, **Raviraj Vankayala**, Chi-Hua Lee, Bahman Anvari*, "Erythrocyte-Derived Nanoparticles with Folate Functionalization for Near Infrared Pulsed Laser-Mediated Photo-Chemotherapy of Tumors" *International Journal of Molecular Sciences*, **2022**, 23, 18, 10295 (IF = 6.208).
- 6) Antony Vincy, Sarmistha Mazumder, Indranil Banerjee, Kuo Chu Hwang, **Raviraj Vankayala*** "Recent Progress in Red Blood Cells-Derived Particles as Novel Bioinspired Drug Delivery Systems: Challenges and Strategies for Clinical Translation", *Frontiers in Chemistry* **2022**, 10, 905256 (IF = 5.54).
- 7) Poliraju Kalluru, Munusamy Shanmugam, **Raviraj Vankayala**, Chi-Shiun Chiang, Kuo Chu Hwang*, "Conquering Multidrug Resistant Lung Cancer by Upconversion Nanoparticles-Mediated Photodynamic Therapy and Gene Silencing", *Journal of Chinese Chemical Society*, **2022**, 69, 8, 1305-1317. (IF = 1.753).

- 8) Netra Hiremath¹, Rahul Kumar¹, Kuo Chu Hwang, Indranil Banerjee, Suresh Thangudu, **Raviraj Vankayala**^{*}, "Near-Infrared Light Activatable Two-Dimensional Nanomaterials for Theranostic Applications: A Comprehensive Review", *ACS Applied Nanomaterials*, **2022**, 5, 2, 1719 (**IF = 6.140**).
¹*Equally contributed*
- 9) Jack Tang¹, Chi-Hua Lee¹, Thompson Lu, **Raviraj Vankayala**, Taylor Hanley, Chiemerie Azubuogu, Jiang Li, Meera Nair, Wangcun Jia, Bahman Anvari "Membrane Cholesterol Enrichment of Red Blood Cell-Derived Microparticles Results in Prolonged Circulation", *ACS Applied Biomaterials*, **2022**, 5, 2, 650.
¹*Equally contributed*.
- 10) Munusamy Shanmugam, Naresh Kuthala¹, **Raviraj Vankayala**¹, Chi-Shiun Chiang, Xiang Yi Kong, Kuo Chu Hwang, "Multifunctional CuO/Cu₂O Truncated Nanocubes as Trimodal Image-Guided Near Infrared-III Photothermal Agents to Combat Multidrug Resistant Lung Carcinoma", *ACS Nano*, **2021**, 15, 9, 14404 (**IF = 15.881**). ¹*Equally contributed*.
- 11) Suresh Thangudu, Navpreet Kaur, Chiranjeevi Korupalli, Vinay Sharma, Poliraju Kalluru, **Raviraj Vankayala**^{*}, "Recent Advances on Near Infrared Light Responsive Multifunctional Nanostructures for Phototheranostic Applications", *Biomaterials Science*, **2021**, 9, 5432 (**IF = 6.84**). *Selected as a hot article for 2021*.
- 12) Joshua M. Burns, Elise Shafer, **Raviraj Vankayala**, Vikas Kundra, Bahman Anvari^{*}, "Near Infrared Fluorescence Imaging of Intraperitoneal Tumors in Mice using Erythrocyte-Derived Optical Nanoparticles and Spatially-Modulated Illumination", *MDPI Cancers*, **2021**, 13, 11, 2544 (**IF = 6.63**).
- 13) Taylor Hanley, **Raviraj Vankayala**, Bahman Anvari^{*}, " Phototheranostics Using Erythrocyte-Based Particles ", *MDPI Biomolecules*, **2021**, 11, 5, 729 (**IF = 4.879**).
- 14) Taylor Hanley, **Raviraj Vankayala**, Jenny Mac, David Lo and Bahman Anvari^{*}, "Acute Immune Response of Micro- and Nano-Sized Erythrocyte-Derived Optical Particles in Healthy Mice", *Molecular Pharmaceutics*, **2020**, 17, 10, 3900 (**IF = 4.939**).
- 15) Jack Tang, **Raviraj Vankayala**, Jenny Mac and Bahman Anvari^{*}, "RBC-Derived Optical Nanoparticles Remain Stable after a Freeze-Thaw Cycle", *Langmuir*, **2020**, 36, 34, 10003 (**IF = 3.882**).
- 16) **Raviraj Vankayala**, Edver Bahena, Yadir Guerrero, Sheela P. Singh, Ravoori K. Murali, Vikas Kundra, Bahman Anvari^{*}, "Virus-mimicking nanoparticles for targeted near infrared fluorescence imaging of intraperitoneal ovarian tumors in mice" *Annals of Biomedical Engineering*, **2020**, 1-12 (**IF = 3.934**).
- 17) Chiranjeevi Korupalli, Poliraju Kalluru, Karthik Nuthalapati, Naresh Kuthala, Suresh Thangudu, **Raviraj Vankayala**^{*} "Recent Advances of Polyaniline-Based Biomaterials for Phototherapeutic Treatments of Tumors and Bacterial Infections", *MDPI Bioengineering*, **2020**, 7, 94, 1-18. (*Corresponding author).
- 18) Venugopalarao Vikram, Srinivasa R. Penumutthu, **Raviraj Vankayala**, Suresh Thangudu, Karteek Rao Amperayani, Umadevi Parimi^{*}, "Design, synthesis, molecular docking and cytotoxic activity of novel urea derivatives of 2-amino-3-carbomethoxythiophene", *Journal of Chemical Sciences*, **2020**, 132, 126 (**IF = 1.573**).
- 19) Naresh Kuthala, **Raviraj Vankayala**, Chi-Shiun Chiang, Kuo Chu Hwang^{*}, "Unprecedented Theranostic LaB₆ Nanocubes-Mediated NIR-IIb Photodynamic Therapy to Conquer Hypoxia-Induced

Chemoresistance" *Advanced Functional Materials*, **2020**, 30, 36, 2002940 (IF = 18.808). *Highlighted as Back cover*.

- 20) Suresh Thangudu, Sagar Kulkarni, **Raviraj Vankayala**, Chi-Shiun Chiang, Kuo Chu Hwang*, "Photosensitized Reactive Chlorine Species-Mediated Therapeutic Destruction of Drug-Resistant Bacteria using Plasmonic Core-Shell Ag@AgCl Nanocubes as External Nanomedicines". *Nanoscale*, **2020**, 12, 12970 - 12984 (IF = 7.790).
- 21) Suresh Thangudu, Poliraju Kalluru, **Raviraj Vankayala***, "Preparation, Cytotoxicity, and In Vitro Bioimaging of Water-Soluble and Highly Fluorescent Palladium Nanoclusters". *MDPI Bioengineering*, **2020**, 7, 1, 20. (*Corresponding author)
- 22) Karthik Nuthalapati, **Raviraj Vankayala**, Naresh Kuthala, Chi-Shiun Chiang, Kuo Chu Hwang* "Engineering New Generation of Near Infrared Light Activatable Photocatalysts as Targeted Nanomaterial-Mediated Phototherapeutic Agents for Treating Drug Resistant Tumors", *Particles and Particle System Characterization*, **2020**, 37, 5, 2000001 (IF = 3.310).
- 23) Wangcun Jia, Joshua Burns, Betty Villantay, Jack C. Tang, **Raviraj Vankayala**, Ben Lertsakdadet, Bernard Choi, J. Stuart Nelson, Bahman Anvari*, "Intra-vital Vascular Phototheranostics and Real-Time Circulation Dynamics of Erythrocyte-Derived Carriers with Tunable Sizes", *ACS Applied Materials and Interfaces*, **2020**, 12, 1, 275-287 (IF = 9.229).
- 24) **Raviraj Vankayala***, Jenny T. Mac*, Joshua M. Burns, Eugene Dunn, Stefanie Carroll, Edver M. Bahena, Dipti K. Patel, Stephen Griffey, Bahman Anvari* "Biodistribution and Toxicology Profiling of Erythrocyte-Derived Optical Particles in Healthy Mice", *Biomaterials Science*, **2019**, 7, 25, 2123-2133 (IF = 6.84). *Equal contribution
- 25) Josh Burns, **Raviraj Vankayala**, Jenny T. Mac, Bahman Anvari*, "Erythrocyte-Derived Theranostic Nanoplatforams for Near Infrared Fluorescence Imaging and Photodestruction of Tumors", *ACS Applied Materials and Interfaces*, **2018**, 10, 33, 27621-27630 (IF = 9.229).
- 26) Jenny T. Mac, **Raviraj Vankayala**, Josh Burns, Bahman Anvari*, "Erythrocyte-Derived Optical Nano-Probes Doped with ICG-Bound Albumin: Material Characteristics and Evaluation for Cancer Cell Imaging", *ACS Biomaterials Science and Engineering*, **2018**, 4, 8, 3055-3062 (IF = 4.749).
- 27) **Raviraj Vankayala**, Samantha R. Corber, Jenny T. Mac, Masaru P. Rao, Mohammad Shafie, Bahman Anvari* "Erythrocyte-Derived Nanoparticles as a Theranostic Agent for Near Infrared Fluorescence Imaging and Thrombolysis of Blood Clots", *Macromolecular Bioscience*, **2018**, 18, 1700379 (IF = 4.979). *Highlighted as Front cover*.
- 28) **Raviraj Vankayala** and Kuo Chu Hwang*, "NIR Light Activatable Nanomaterials-Mediated Phototheranostic Nanomedicines: An Emerging Paradigm for Cancer Treatment", *Advanced Materials*, **2018**, 1706320 (IF= 30.849). *Invited review paper*.
- 29) Naresh Kuthala, **Raviraj Vankayala**, Yi-Nan Li, Chi-Shiun Chiang, Kuo Chu Hwang*, "Engineering Novel Targeted Boron-10 Enriched Theranostic Nanomedicine to Combat against Murine Brain Tumors via MR Imaging-Guided Boron Neutron Capture Therapy", *Advanced Materials*, **2017**, 29, 31, 1700850-1700860 (IF = 30.849).
- 30) Poliraju Kalluru, **Raviraj Vankayala**, Chi-Shiun Chiang, Kuo Chu Hwang* "Unprecedented "All-in-one" Lanthanide-doped Mesoporous Silica Frameworks for Fluorescence/MR Imaging and

Combination of NIR Light Triggered Chemo-Photodynamic Therapy of Tumors”, *Advanced Functional Materials*, **2016**, 26, 43, 7908-7920 (IF = 18.808).

- 31) Poliraju Kalluru, **Raviraj Vankayala**, Chi-Shiun Chiang, Kuo Chu Hwang* “Nano-Graphene Oxide-mediated In vivo Fluorescence Imaging and Bimodal Photodynamic and Photothermal Destruction of Tumors”, *Biomaterials*, **2016**, 95, 1-10 (IF= 12.479)
- 32) Kranti Kumar Gangu, **Raviraj Vankayala**, Anima S. Dadhich, Mukkamala Saratchandra Babu*, “Influence of 1,2,3,4-butanetetracarboxylic acid on photoluminescence property of Gd(III)-doped fluorapatite”, *Journal of Indian Chemical Society*, **2016**, 93, 159-163 (IF= 0.284)
- 33) **Raviraj Vankayala**, Chien-Lin Kuo, Karthik Nuthalapati, Chi-Shiun Chiang, Kuo Chu Hwang* “Nucleus Targeting Gold Nanoclusters for Simultaneous *In vivo* Fluorescence Imaging, Gene Delivery and NIR Light Activated Photodynamic Therapy”, *Advanced Functional Materials*, **2015**, 25, 5934-5945. *Highlighted as Frontispiece.* (IF = 18.808).
- 34) Priya Vijayaraghavan, **Raviraj Vankayala**, Chi-Shiun Chiang, Hsing-Wen Sung, Kuo Chu Hwang*, “Complete Destruction of Deep Tissue-Buried Tumors under Ultra-Low Doses of NIR Light Irradiation via Combination of Gold Nanoechinus-Mediated Photodynamic Therapy and Gene Silencing”, *Biomaterials*, **2015**, 62, 13-23. (IF= 12.479).
- 35) Jing-Wun Fan, **Raviraj Vankayala**, Chien-Liang Chang, Chia-Hua Chang, Chi-Shiun Chiang, Kuo Chu Hwang* “Preparation, Cytotoxicity, and *in vivo* Bioimaging of Highly Luminescent Water-Soluble Silicon Quantum Dots”, *Nanotechnology*, **2015**, 26, 215703 (IF= 3.874).
- 36) Suresh Babu Maddineedi, Badal Kumar Mandal*, **Raviraj Vankayala**, Poliraju Kalluru, Pamanji Sreedhara Reddy, “Bioinspired reduced graphene oxide nanosheets using *Terminalia chebula* seeds extract”, *Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy*, **2015**, 145, 117-124 (IF= 4.098).
- 37) Priya Vijayaraghavan, Cheng-Hong Liu, **Raviraj Vankayala**, Chi-Shiun Chiang, Kuo Chu Hwang*, “Designing Multi-Branched Gold Nanoechinus for NIR Light Activated Dual Modal Photodynamic and Photothermal Therapy in the Second Biological Window”, *Advanced Materials*, **2014**, 26, 6689-6695. (IF= 30.849) *Highlighted as Frontispiece.*
- 38) **Raviraj Vankayala**, Chi-Shiun Chiang, Jui-I Chao, Chiun-Jye Yuan, Shyr-Yeu Lin, Kuo Chu Hwang*, “A General Strategy to Achieve Ultra-High Gene Transfection Efficiency using Lipid-Nanoparticle Composites”, *Biomaterials*, **2014**, 35, 8261-8272 (IF= 12.479).
- 39) **Raviraj Vankayala**, Chun-Chih Lin, Poliraju Kalluru, Chi-Shiun Chiang, Kuo Chu Hwang*, “Gold Nanoshells-Mediated Bimodal Photodynamic and Photothermal Cancer Treatment Using Ultra-Low Doses of Near Infra-red Light”, *Biomaterials*, **2014**, 35, 5527 (IF= 12.479).
- 40) Sireesh Babu Maddineedi, Badal Kumar Mandal*, **Raviraj Vankayala**, Poliraju Kalluru, Sai Kumar Tamina, H.A. Kiran Kumar, “Casein mediated green synthesis and decoration of reduced graphene oxide”, *Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy*, **2014**, 126, 227-231. (IF= 4.098).
- 41) **Raviraj Vankayala**, Poliraju Kalluru, Chi-Shiun Chiang, Kuo Chu Hwang*, “Effects of Surface Functionality of Carbon Nanomaterials on Short-Term Cytotoxicity and Embryonic Development in Zebrafish”, *Journal of Material Chemistry B* **2014**, 8, 1038-1047. (IF= 6.331).

- 42) **Raviraj Vankayala**, Poliraju Kalluru, Yu-Kuan Huang, Chi-Shiun Chiang, Kuo Chu Hwang*, "First Demonstration of Gold Nanorods-Mediated Photodynamic Therapeutic Effects on Destruction of Tumors via Near Infra-red Light Activation and Without Additional Organic Photosensitizers", *Small* **2014**, 10, 8, 1612-1622 (IF= 13.281).
- 43) Poliraju Kalluru, **Raviraj Vankayala**, Chi-Shiun Chiang, Kuo Chu Hwang*, "Photosensitization of Singlet Oxygen and In vivo Photodynamic Therapeutic Effects -Mediated by PEGylated W₁₈O₄₉ Nanowires for Destruction of Tumors", *Angew. Chem. Int. Ed.* **2013**, 39,12332-12336. (IF = 15.336) *Highlighted as an inside back cover.*
- 44) **Raviraj Vankayala***, Ganesh Gollavelli, Badal Kumar Mandal, "Highly fluorescent and biocompatible iridium nanoclusters for cellular imaging", *Journal of Materials Science: Materials in Medicine*, **2013**, 8, 1993-2000 (IF = 4.220).
- 45) **Raviraj Vankayala**, Chien-Lin Kuo, Arunachalam Sagadevan, Po-Hung Chen, Chi-Shiun Chiang, Kuo Chu Hwang*, "Morphology Dependent Photosensitization of Singlet Oxygen by Gold and Silver Nanoparticles and its Application in Cancer Treatment", *Journal of Material Chemistry B*, **2013**, 1, 4379-4387. (IF= 6.331) *Selected as a hot article by the editor for 2013.*
- 46) Badal Kumar Mandal, Kesarla Mohan Kumar, and **Raviraj Vankayala**, "Synthesis of zero valent iron nanoparticles and application to removal of arsenic(III) and arsenic(V) from water", *Journal of Indian Chemical Society*, **2012**, 89, 5, 1215-1221 (IF= 0.284).
- 47) Badal Kumar Mandal, **Raviraj Vankayala**, and L. Uday Kumar, "Speciation of Chromium in Soil and Sludge in the Surrounding Tannery Region, Ranipet, Tamil Nadu," *ISRN Toxicology*, vol. **2011**, Article ID 697980, 10 pages, **2011**. doi:10.5402/2011/697980.
- 48) **Raviraj Vankayala**, Arunachalam Sagadevan, Priya Vijayaraghavan, Chien Lin Kuo, Kuo Chu Hwang*, "Metal Nanoparticles Sensitize Formation of Singlet Oxygen", *Angew. Chem. Int. Ed.* **2011**, 50, 10640. (IF= 15.336).
- 49) **Raviraj Vankayala**, Wei-Jen Petrick Lai and Kuo Chu Hwang*, "Enhanced electrical conductivity of nylon 6 composite using polyaniline-coated multi-walled carbon nanotubes as additives", *Polymer*, **2011**, 52, 3337-3343. (IF= 4.430).
- 50) Qingxin Mu, Lei Yang, James C. Davis, **Raviraj Vankayala**, Kuo Chu Hwang, Jincai Zhao and Bing Yan*, "Biocompatibility of Polymer Grafted Core/Shell Iron/Carbon Nanoparticles", *Biomaterials*, **2010**, 31, 5083-5090. (IF= 12.479).

Conference Papers

- 1) Chi-Hua Lee, Jack C. Tang, **Raviraj Vankayala**, Jenny T. Mac, Taylor Hanley, Bahman Anvari, "Cholesterol-enriched and folate-functionalized erythrocyte-derived optical nanoparticles for NIR fluorescence imaging of intraperitoneal ovarian tumors in mice", *Proc. SPIE, Reporters, Markers, Dyes, Nanoparticles, and Molecular Probes for Biomedical Applications XIII*, **2021**. DOI: 10.1117/12.2582797.
- 2) Thompson Lu, Jenny T Mac, Ramzi Tweini, Kimmy Tran, **Raviraj Vankayala**, Bahman Anvari, "Mechanical characterization of erythrocyte-derived optical microparticles by quantitative phase imaging and optical tweezers", *Quantitative Phase Imaging V: International Society for Optics and Photonics* **2019**.

- 3) Joshua M. Burns, **Raviraj Vankayala**, Jenny T. Mac, Bahman Anvari, "Fluorescence Imaging and Photodynamic Therapy of Breast Cancer Cells Using Erythrocyte-Derived Near Infrared Nanoparticles" in **ASLMS 2017**.
- 4) Jenny T. Mac, Joshua M. Burns, **Raviraj Vankayala**, Bahman Anvari, "Light-Activated Erythrocyte-Derived Nanoparticles for Chemo-Photothermal Therapeutic Effects", in **ASLMS 2017**.
- 5) **Raviraj Vankayala**, Jenny. T. Mac, Edver Bahena, Bahman Anvari, "Virus-mimicking Hybrid Nanostructures Containing Indocyanine Green and Albumin for Near Infrared Fluorescence Imaging of Ovarian Cancer Cells," in *Optics in the Life Sciences Congress, OSA Technical Digest (online) (Optical Society of America, 2017)*, **paper OmW2D.4**.
- 6) Jack C. Tang, Jenny T. Mac, **Raviraj Vankayala**, A. Partono, W. Jia, Bahman Anvari, "Effects of Freezing on Erythrocyte-derived Optical Nanoprobes," in *Optics in the Life Sciences Congress, OSA Technical Digest (online) (Optical Society of America, 2017)*, **paper OmTu2D.4**.
- 7) **Raviraj Vankayala**, Joshua M. Burns, Jenny T. Mac, Bahman Anvari "Light-based theranostics using hybrid structures derived from biological and organic materials", *Proc. SPIE 9930, Biosensing and Nanomedicine IX, 993008, 2016, DOI: 10.1117/12.2238406*.

Book Chapters

- 1) **Raviraj Vankayala**, Suresh Thangudu, Naresh Kuthala, Poliraju Kalluru, "MXenes and their composites for biomedical applications". Elsevier book entitled MXenes and their composites: Synthesis, properties and potential applications, **2021**, ISBN: 9780128233610.
- 2) Poliraju Kalluru and **Raviraj Vankayala**, "2D Nanomaterials for Biomedical Applications". Wiley book entitled 2D Functional Nanomaterials: Synthesis, Characterization and Applications, **2021**, ISBN: 9783527346776.
- 3) Hemant Singh, Ramesh Singh, Aniruddha Dan, Hitasha Vithalani, Sabya Sachi Das, Antony Vincy Fernando, **Raviraj Vankayala**, Dhiraj Bhatia, Mukesh Dhanka, "Bioconjugated materials as potential vehicles for delivery of antibiotics/drugs" **2023**, ISBN no. 9780443131998 (Elsevier).

Patents

- **Colorimetric sensor for the detection of bacterial contamination and biofilms** (Provisional filing application number. 202311023777). **Inventors:** Antony Vincy, Yohan Gaikwad, Neha Jain, Raviraj Vankayala.
- **Method for Generating Singlet Oxygen - Published on 13 March 2014** (Patent US20140074009 dated 2012/09/12). **Inventors:** Raviraj Vankayala and Kuo Chu Hwang.

Honors, Awards and Memberships

- **2007-2011:** Successful recipient of National Tsing Hua University International Student Scholarship for four consecutive years.
- **2011:** Best Poster Award presented in Spring Symposium of Photochemistry Association in Taiwan held at National Chao Tang University for the paper entitled "Multi-functional lipid-dye-Fe@CNPs conjugates for photo-induced destruction of cancer cells".
- **2011:** Received publication award from Department of Chemistry, National Tsing Hua University, Taiwan for the paper entitled, "Enhanced electrical conductivity of nylon 6 composite using polyaniline-coated multi-walled carbon nanotubes as additives" (Polymer 2011, 52, 3337-3343).

- **2011:** Received publication award from Department of Chemistry, National Tsing Hua University, Taiwan for the paper entitled, “*Metal nanoparticles sensitize formation of singlet oxygen*” (Angewandte Chemie, 2011, 50, 10640-10644).
- **2012-2015:** Successful recipient of Ministry of Science and Technology (MOST) Postdoctoral fellowship in Taiwan for three consecutive years.
- **2014:** Recipient of **DST INSPIRE Faculty Award**.
- **2017-2018:** Served as a Member in the **Membership Committee of ASLMS**.
- **2018:** Editorial Board Member of **Bulletin of Chemical and Pharmaceutical Research (BCPR) Journal**.
- **2018:** Honorable Editor of **Journal of Advanced Drug Delivery Research (MedCrave)**.
- **2018:** Recipient of **Ramalingaswami Biomedical Fellowship by Department of Biotechnology, India**.
- **2020:** Guest Editor in MDPI Bioengineering journal for a special issue entitled “*Engineering Novel Multifunctional Nanostructures for Various Biomedical Applications*”.
- **2020:** Review Editor for Frontiers in Bioengineering and Biotechnology, Frontiers in Molecular Biosciences, Frontiers in Chemistry, and Frontiers in Drug Delivery journals.
- **2021:** Topic Editor for Frontiers in Nanotechnology journal for a special issue entitled “*Multifunctional Nanomaterials for Biosensors and Therapeutics*”.
- **2021:** Guest Editor in MDPI Nanomaterials journal for a special issue entitled “*Advances in Nanomaterials Mediated Photodynamic Therapy*”.
- **2021:** Regular member of **Royal Society of Chemistry**.
- **2021:** Recipient of **Research Excellence Award at IIT Jodhpur**.

Scientific Presentations

Posters

- Presented a poster in Asia and Oceania Conference on Photochemistry-2011, held at Nara, Japan.
- Presented a poster in Asian Photochemistry Association Symposium-2010, held at NCTU, Taiwan.
- Presented a poster in four lateral research exchange conference-2010 held at NTHU, Taiwan.
- Presented a poster in NTHU-KAIST conference -2009 held at NTHU, Taiwan.

Oral Talks

1. **Raviraj Vankayala**, Yu-Kuan Huang, Poliraju Kalluru, Chi-Shiun Chiang, Kuo Chu Hwang, “First Demonstration of Gold Nanorods-Mediated Photodynamic Therapeutic Destruction of Tumors via Near Infra-Red Light Activation”, **Spring Symposium of Photochemistry Association in Taiwan, Hsinchu, Taiwan (01/2015)**.
2. **Raviraj Vankayala**, Chien-Lin Kuo, Karthik Nuthalapati, Chi-Shiun Chiang, Kuo Chu Hwang, “Nucleus Targeting Gold Nanoclusters for Simultaneous *in vivo* Fluorescence Imaging, Gene Delivery and NIR Light Activated Photodynamic Therapy”, **NANOS 2015, GITAM University, India (12/2015)**.
3. **Raviraj Vankayala**, Joshua M. Burns, Jenny T. Mac, Bahman Anvari, “Light-Based Theranostics using Hybrid Structures Derived from Biological and Organic Materials”, **SPIE Optics and Photonics 2016, San Diego, CA, USA (08/2016)**.
4. **Raviraj Vankayala**, Jenny. T. Mac, Edver Bahena, Bahman Anvari, "Virus-mimicking Hybrid Nanostructures Containing Indocyanine Green and Albumin for Near Infrared Fluorescence Imaging of Ovarian Cancer Cells," in **Optics in the Life Sciences Congress 2017, San Diego, USA (04/2017)**.

Invited Lectures

1. Invited as a colloquium speaker in *Department of Biomedical Engineering, IIT-BHU, Varanasi, India* and delivered a talk entitled “Designing Multi-functional Nano‘bullets’ for Cancer Theranostics” (20 March 2016).
2. Invited as a colloquium speaker in *Department of Bioengineering, University of California Riverside* and delivered a talk entitled “Engineering Multi-Functional Nanostructures Derived from Inorganic, Organic and Biological Materials for Light-Based Theranostics” (01 March 2017).
3. Invited as a colloquium speaker in *Department of Chemistry, IIT Hyderabad, Telangana, India* and delivered a talk entitled “Engineering Multi-Functional Nanostructures Derived from Inorganic and Biological Materials for Light-Based Theranostics” (16 August 2018).
4. Invited as a colloquium speaker in *Department of Chemistry, GITAM College of Science, India* and delivered a talk entitled “Engineering Multi-Functional Nanostructures Derived from Inorganic and Biological Materials for Light-Based Theranostics” (19 August 2019).
5. Invited as a colloquium speaker in *Department of Applied Chemistry, National Chiao Tung University, Hsinchu, Taiwan* and delivered a talk entitled “Inorganic and Biomimetic Nanostructures for Theranostic Applications” (03 January 2020).
6. Invited as a colloquium speaker in *Department of Medicinal and Applied Chemistry, Kaohsiung Medical University, Kaohsiung, Taiwan* and delivered a talk entitled “Engineering Inorganic and Biomimetic Nanostructures for Theranostic Applications” (06 January 2020).
7. Invited as a speaker in a two-day national webinar on **Analytical and Diagnostic tools in Lifesciences organized by Andhra University and Andhra Pradesh Akademi of Sciences, Visakhapatnam** and delivered a talk entitled “Engineering Inorganic and Biomimetic Nanostructures for Theranostic Applications” (06 June 2020).
8. Invited as a speaker in a national webinar **organized by Vignan College of Pharmacy, Guntur** and delivered a talk entitled “Engineering Inorganic and Biomimetic Nanostructures for Theranostic Applications” (26 June 2020).
9. Invited as a speaker at **KPR Institute of Engineering and Technology (KPRIET), Coimbatore** and delivered a talk entitled “Nanomaterials for Biomedical Applications” (15 July 2020).
10. Invited as a colloquium speaker in *Department of Basic Science and Humanities, Vignan College, Visakhapatnam* and delivered a talk entitled “Theranostic Nanomedicines: Translating from Bench to Bedside and Beyond” (02 July 2021).
11. Invited as a speaker in *S. R. Rajasthan Ayurved University, Jodhpur* and delivered a talk entitled “Theranostic Nanomedicines: Translating from Bench to Bedside and Beyond” (19 July 2022).

Scientific Skills Expertise

- **Materials Synthesis:** Experienced in preparing variety of nanomaterials, such as metal nanoparticles, metal-filled carbon nanoparticles, and graphene-based materials.
- **Surface modifications:** Experienced in doing surface modifications to nanoparticles, such as, targeting ligands, peptides, and antibodies.

- **Materials Characterization:** SEM, TEM, TGA, UV-Vis-NIR, Raman, DLS and Single Photon Counter (Steady state measurements).
- **Plant biotechnology:** Experienced in handling plant biotechnology experiments, such as growing and infecting plants with LEVEL-1 viruses and then further extracting the capsid proteins to construct various organic dye-loaded virus-like nanoparticles.
- **Biology experiments:** Experienced in handling mammalian cell cultures, transfection experiments, drug delivery and phototherapeutic destruction of cancer cells, Flow Cytometry FACS Calibur, Fluorescence Microscopy, Confocal Laser Scanning Microscopy (LSM 700), Gel Electrophoresis Techniques, DNA Purification Techniques.
- ***In vivo* experiments:** Experience in handling zebrafish (microinjection techniques), mouse animal models, frozen tissue sectioning (mouse organs and tumor tissue for immunological / histological tissue examination) and also acquired license for IVIS Caliper Small Animal Imaging System.

Technical Background

- **Operating Systems:** DOS, WINDOWS, MS OFFICE Languages: C
- **Softwares:** Origin 8, Graph Pad Prism, Flow Jo, Win MDI 2.9, Chem Bio draw, Image Pro plus, Image J and Adobe Photoshop.
- **Scientific Search:** Well familiar with literature searches in various online databases, such as, ISI Web of Science, SciFinder and Scopus.

Research Highlights

1. The research paper entitled, "Photosensitization of Singlet Oxygen and *In vivo* Photodynamic Therapeutic Effects-Mediated by PEGylated $W_{18}O_{49}$ Nanowires for Destruction of Tumors" published in **Angewandte Chemie** as **Inside Back Cover Page**.
2. The research paper entitled, "First Demonstration of Gold Nanorods-Mediated Photodynamic Therapeutic Effects on Destruction of Tumors via Near Infra-red Light Activation and Without Additional Organic Photosensitizers" published in **Small** was highlighted by a leading nanoscience blog, **Nanowerk**, **Future Med Chem. (2014) 6(4), 370** and also by **Antibody Resource Website**.
3. The research paper entitled, "Designing Multi-Branched Gold Nanoechinus for NIR Light Activated Dual Modal Photodynamic and Photothermal Therapy in the Second Biological Window" published in **Advanced Materials** as **Frontispiece** and by **Asian Scientist Magazine**.
4. The research paper entitled, "Nucleus Targeting Gold Nanoclusters for Simultaneous *In vivo* Fluorescence Imaging, Gene Delivery and NIR Light Activated Photodynamic Therapy" published in **Advanced Functional Materials** as **Frontispiece**.
5. The research paper entitled, "Erythrocyte-Derived Nanoparticles as a Theranostic Agent for Near Infrared Fluorescence Imaging and Thrombolysis of Blood Clots" published in **Macromolecular Bioscience** as **Journal Front Cover**.
6. The research paper entitled, "Unprecedented Theranostic LaB_6 Nanocubes-Mediated NIR-IIb Photodynamic Therapy to Conquer Hypoxia-Induced Chemoresistance" published in **Advanced Functional Materials** as **Journal Back Cover**.