

# CURRICULUM VITAE

## MALLIKARJUNA REDDY KESAMA (M.Sc., Ph.D.)

Postdoctoral Research Associate, Department of Mechanical Engineering, Purdue University, West Lafayette, Indiana, USA.

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## RESEARCH, INDUSTRIAL, AND ACADEMIC EXPERIENCE

Post Ph.D., Experience – **5.7** Years

Research (Ph. D. Scholar/Studies) – **5** Years

Industry (Sr. Technical Officer) – **4.6** Years

Physics Tutor (During M.S. Studies and Later) – **2.3** Years

Science Teacher – **<1** Years



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## CAREER OBJECTIVE

Aspiring to work as a Scientist or Postdoctoral Researcher in a reputed organization where I can leverage my expertise and experience to contribute meaningfully to scientific advancements while taking on a leading and impactful role.

## BRIEF SUMMARY OF EXPERIENCE

Interdisciplinary expertise in biophysics, DNA nanotechnology, biomaterials, polymers, synthetic vesicles, thin films, energy harvesting, and sensors, with a strong track record of integrating advanced research into practical applications.

✚ **Postdoctoral Research Associate**, *Department of Mechanical Engineering*, (lab: [choinano.org](http://choinano.org)), *Purdue University, USA*. (12. 2023 – Present)

Working on Biomaterials, Cell-mimicking systems constructed by synthetic vesicles and Origami DNA for proteolysis, RCA, and drug delivery systems.

✚ **Postdoctoral Researcher**, *Department of Physics*, (lab: [dnanano.skku.edu](http://dnanano.skku.edu)), *Sungkyunkwan University, South Korea* (05. 2022 – 01. 2023)

Multidisciplinary research fields, materials science and polymers, energy harvesting devices, photodetectors, and sensors.

✚ **Postdoctoral Researcher**, *Basic Science Research Institute*, (lab: [boel.ajou.ac.kr](http://boel.ajou.ac.kr)), *Ajou University, South Korea* (7.2021 - 4.2022)

Focused on materials science, specifically utilizing marine waste-derived salmon DNA and silk cocoon fibroin protein polymers in multidisciplinary research fields, especially on Triboelectric Nanogenerators (TENGs).

- ✚ **Postdoctoral Researcher**, *Institute of Basic Sciences (IBS, [cinap.ibs.re.kr](http://cinap.ibs.re.kr)) & Institute of Quantum Biophysics (IQB, [iqb.skku.edu](http://iqb.skku.edu))*, Sungkyunkwan University, South Korea (10. 2019 - 06.2021)

Synthetic and Salmon DNA materials, neurodegenerative diseases, especially on physical studies of Amyloid beta protein mutations, cause Alzheimer's.

- ✚ **Senior Technical Officer**, *Hing High Vacuum Company Pvt. Ltd., ([www.hhv.in](http://www.hhv.in) & [www.hhvltd.com](http://www.hhvltd.com))*, Bangalore, India (21.12.2009 – 1.8.2014)

Managed design, testing, and optimization of vacuum coating systems used in R&D and manufacturing. Extensive hands-on experience with thermal/e-beam evaporation, sputtering, RIE, and PECVD systems.

- ✚ **Physics Tutor**, *Sri Chaitanya Educational Institutions ([srichaitanya.net](http://srichaitanya.net))*, Tirupati, Andhra Pradesh, India (06. 2007 – 10. 2009)

Taught Intermediate college physics (Grades 11–12), including labs and entrance exam preparation, during master's studies.

- ✚ **Science Teacher**, *Z. P. High School, Andhra Pradesh, India (2006 – 2007)*

Delivered science curriculum for 8-10 under the Board of Secondary School Education.

## ACADEMIC CREDENTIALS

- ✚ **Doctor of Philosophy in Science**, *Department of Physics, (lab: [dnanano.skku.edu](http://dnanano.skku.edu))*, Sungkyunkwan University, South Korea (10. 2014 – 08. 2019)

**Thesis:** *Characterization of multifunctional nanomaterials embedded DNA thin films for usage in nanotechnology.*

**Grade:** A<sup>+</sup>, **PI:** Prof. Sung Ha Park

Ph.D. in Science, DNA Nanotechnology, Synthetic and Salmon DNA, Functionalized DNA for enhancing the functionalities of optoelectronic and energy harvesting devices and sensors.

- ✚ **Master of Science (M. Sc.)**, *Sri Venkateswara University, Tirupati ([svuniversity.edu.in](http://svuniversity.edu.in))*, Andhra Pradesh, India (2007-2009)

M. Sc., in *Physics*, Graduated with Distinction (Aggregate: 77.6%), Specialization: Vacuum and Thin Film Technology.

✚ **Bachelor of Science (B. Sc.), Sri Venkateswara University, Andhra Pradesh, India**  
(2003-2006)

B. Sc., in *Physics, Chemistry, and Mathematics* (Aggregate: 64.7%)

✚ **Intermediate (Senior Secondary) Education, Board of Intermediate Education, Andhra Pradesh, India** (2001-2003)

## AWARDS, HONORS, & FELLOWSHIPS

✚ **Research Scholarship**, under the **BK21+** program funded by the National Research Foundation (NRF), Govt. of South Korea (2014 – 2018)

✚ **A plus (A<sup>+</sup>)** grading (4.105 out of 4.5) in Ph.D. studies

✚ Qualified for the **SVUCET** exam for master's course (M.Sc., Physics) admissions

✚ **Best employee award** from Hind High Vacuum Company Pvt. Ltd., India (2013)

✚ **Outstanding Academic Performance, M. Sc. (Physics)**, Sri Venkateswara University

✚ **First Prize**, Competitive Examination, Sri Muni Narayana College, A.P., India

✚ **Best Poster Award**, Korean Physical Society (*KPS*), April 24-26, 2019, South Korea

## MEMBERSHIP IN PROFESSIONAL BODIES

✚ Chemical and Materials Engineering (4196-3905 – 6773-5856, July 25<sup>th</sup>, 2020)

✚ International Journal of Materials Science and Applications (Nov.8, 2022 – present)

✚ Industrial and Manufacturing Engineering

## REVIEWER AND EDITORIAL ACTIVITIES

✚ ACS applied nano materials, Plos One, Nanotechnology, Sensors, and Actuators: A. Physical, NANO, inorganics, ACS applied energy materials, and conferences. - **#55**

✚ PLOS ONE Editorial Board as an **Academic Editor** (22.12.2022 – Present) - **#25**

## SKILLS ON MATERIALS SYNTHESIS, CHARACTERIZATION, TOOLS, DEVICES & SOFTWARE TOOLS

### Materials and Synthesis

- |                                    |                                      |
|------------------------------------|--------------------------------------|
| • 0D-3D Chemical reduction methods | • Construction of porous materials   |
| • Hydrothermal                     | • Biopolymers & composites           |
| • One-pot methods                  | • Synthetic vesicles (GUV & SUV)     |
| • Cocoon silk protein synthesis    | • Amyloid beta protein               |
| • Biocompatible Nanomaterials      | • Synthetic origami E.coli DNA & RNA |

- DNA & RNA Hydrogels
- 3D printing
- Biocompatible tattoos
- Dip & Spin-coating, Drop-casting
- Fiber's metallization
- Chemical Evaporation
- Carbonization
- Microfluidic channels
- Cellulose, Chitin, Whey protein
- PVDF, Egg white
- DNA Crystals
- Casting/Solvent Evaporation
- Photobiomodulation
- Electrospinning & R2R coating
- Brushing & Doctor blade methods
- Polymer Molding
- Biocompatible electrical patches
- Biocompatible contact lens
- Flexible, biodegradable devices
- Gelation, ionic gel, peptides

### **Characterization Tools and**

- Thermal & Electron beam Evaporators
- Sputtering coater
- dPAGE
- AFM (Super user)
- UV-Vis-NIR absorbance
- Cathode luminescence
- Raman
- XPS
- CD spectrophotometer
- Polarizing Optical Microscope (POM)
- Probe station
- Cyclic voltammetry (CV)
- VSM
- TGA, DTA, DSC
- DMA
- Spray coating
- PECVD and RIE
- RCA
- FESEM, EDS (Super user)
- Fluorescence
- FTIR
- XRD
- UPS
- Ellipsometry
- ToF-SIMS
- Semiconductor test analyzer
- Electrochemical impedance spectra
- SQUID
- Nano-indenter
- Inverted microscope (Epi & TIRF)

### **Devices**

- Flexible Capacitors
- Triboelectric nanogenerators
- soft-state lasers
- BioLEDs
- Contact Lens
- Memory devices
- broadband photodetectors
- Supercapacitors
- Solar Cells
- FET
- Drug delivery Patches
- Photocatalysis

## Software and Computational Tools

- Origin Lab
- AutoCAD
- oxDNA
- Snupy
- Gwyddion
- GIMP
- VSDC
- Adobe Illustrator
- Cadnano
- Scadnano
- ImageJ
- VMD
- DCA
- Typing Master

## Artificial Intelligence (AI) Tools

- Scite
- Litmaps
- Notebook LM
- Perplexity
- Elicit
- Inciteful

## RESEARCH EXPERIENCE IN DETAILS

### **4<sup>th</sup> Postdoctoral Research Associate, *Mechanical engineering, Purdue university, USA.***

- ✚ Designed a variety of DNA origami structures using Cadnano software to enable programmable nanoscale assemblies.
- ✚ Synthesized biomaterials such as vesicles and functionalized DNA strands for targeted binding to vesicles, simulating biological gate channels similar to those found in cell membranes.
- ✚ Employed techniques including gel electrophoresis, dialysis, and vesicle-DNA binding for the development of cell-mimicking systems.
- ✚ Investigated complex cellular behaviours such as viability, differentiation, and migration, using dynamic synthetic cell models capable of receiving, transducing, and transmitting intercellular signals.
- ✚ Constructed microfluidic channels to study interactions between large and small vesicles, with potential applications in targeted drug delivery.
- ✚ Developed Rolling Circle Amplification (RCA)-based bio-factory systems and performed comprehensive morphological, optical, electrical, thermal, and mechanical characterizations.
- ✚ The overarching goal of this research is to integrate these techniques for advanced drug delivery platforms and the construction of functional nanodevices.

### **3<sup>rd</sup> Postdoctoral Researcher, *Dept. of Physics, Sungkyunkwan University, South Korea.***

- ✚ Investigated optical, electrical, mechanical, and thermal properties of metal and metal oxide nanomaterial-incorporated DNA hybrids, utilizing self-supporting, flexible DNA thin films for potential applications in rollable and flexible broadband photodetectors and capacitors.
- ✚ Developed nanomaterial polymer composite fiber mats with directional alignment to improve the performance of energy harvesting devices.
- ✚ Achieved mass production of surface-metallized DNA-based ferromagnetic fibers through ion exchange and self-metallization techniques, enabling the transformation of polymer fibers into polycrystalline or single-crystalline structures.
- ✚ Engineered transition metal and lanthanide ion-coated DNA nanofibers for use in flexible magnetrons and highly luminescent materials, leveraging DNA-based composites for advanced optoelectronic and magnetic applications.

**2<sup>nd</sup> Postdoctoral Researcher, *Dept. of Energy Systems, Ajou University, South Korea.***

- ✚ Developed bio-inspired materials for wearable and implantable bioelectronics, focusing on biocompatible and biodegradable silk fibroin protein-based systems for multidisciplinary applications.
- ✚ Designed nanomaterial-functionalized DNA-based triboelectric nanogenerators (TENGs) capable of energy harvesting from biomechanical motions, activating LEDs, and operating under varying conditions such as broad-spectrum light exposure and temperature changes, with potential applications in energy storage devices.
- ✚ Engineered functionally embedded biopolymer-based broadband photodetectors for flexible electronics, including rollable capacitors and human–machine interface sensors.
- ✚ Created self-powered and eco-friendly electronic tattoos and contact lenses using silk fibroin and DNA hybrids, targeting next-generation bioelectronic devices and drug delivery systems.

**1<sup>st</sup> Postdoctoral Researcher, *Institute of Basic Sciences (IBS) and Institute of Quantum Biophysics (IQB), South Korea.***

- ✚ Studied the physical properties of amyloid-beta (A $\beta$ ) protein mutations associated with neurodegenerative diseases such as Alzheimer's, Parkinson's, Prion, and Huntington's diseases.
- ✚ Employed near-field terahertz (THz) conductance measurements to distinguish between the monomeric, oligomeric, and fibrillar stages of A $\beta$  protein aggregation.

- ✚ Designed an electrochemical biosensor for the early detection of A $\beta$  protein structural transitions from monomers to fibrils, characterized using cyclic voltammetry (C-V) and electrochemical impedance spectroscopy (EIS).
- ✚ Developed directionally aligned functionalized DNA structures to enhance electrical and optical properties in advanced device applications, including laser amplification, triboelectric nanogenerators, photodetectors, and field-effect transistors (FETs).
- ✚ Conducted a comprehensive review on photobiomodulation and its therapeutic effects on neurodegenerative disorders, with a focus on Alzheimer's and Parkinson's diseases.

### DOCTORATE PROGRAM (PH.D.) STUDIES DESCRIPTION

During my Ph.D., I conducted multidisciplinary research focused on biocompatible structural synthetic DNA and salmon DNA polymers, exploring their interactions with a wide range of nanomaterials. These studies aimed to enhance the functionality of DNA-based materials for applications in human interface devices, sensors, and next-generation bioelectronics.

I successfully developed synthetic DNA lattices, primarily double-crossover structures due to their high stability, and worked extensively with natural and surfactant-modified salmon DNA. My work involved synthesizing nanoparticles, quantum dots, and porous materials using hydrothermal, chemical reduction, and one-pot methods.

*A diverse set of nanomaterials were incorporated, including:*

- Metal and metal oxide nanoparticles, TMDs, graphene, quantum dots (e.g., CdSe/ZnS, carbon), nanowires (Ag, Al<sub>2</sub>O<sub>3</sub>), and nanotubes (MWCNTs functionalized with –OH, –COOH, –TiO<sub>2</sub>)
- Ions (lanthanides, transition metals), drug molecules (e.g., doxorubicin, vitamin B12, cytochrome-c), and light-responsive compounds (e.g., azobenzene)
- I fabricated DNA-nanomaterial thin films using simple, scalable techniques such as annealing (free solution and substrate growth), drop-casting, spin-coating, brushing, and directional shearing, and constructed devices via thermal, e-beam, and sputtering deposition.
- My work emphasized understanding nanomaterial, DNA interactions, binding affinity, structural stability, and doping optimization, crucial for achieving high-performance, functionally embedded DNA thin films.

*To characterize materials and devices, I employed a wide array of techniques:*

- *Structural & Morphological:* AFM, SEM, TEM, POM

- *Optical & Spectroscopic*: UV-Vis-NIR, PL, FTIR, Raman, CD, XRD, XPS, EDS, UPS, ToF-SIMS, Ellipsometry
- *Electrical & Magnetic*: I–V measurements, impedance, photocurrent, SQUID, VSM
- *Thermal & Mechanical*: TGA, DSC, DTA, Nanoindentation
- These efforts supported advancements in optoelectronics, spintronics, energy harvesting (TENGs, supercapacitors, solar cells), photodetectors, OLEDs, and biosensors.
- Overall, I developed strong skills in device fabrication, experimental design, data analysis, and scientific writing, allowing me to work across disciplines. Moving forward, I aim to lead a research group, implement innovative ideas, and expand the impact of my work in biomaterials and nanotechnology.

## INDUSTRIAL EXPERIENCE

### **Senior Technical Officer, *Hind High Vacuum Company Pvt. Ltd., Bangalore, India.***

HHV is a leading global manufacturer of vacuum and thin film coating systems, supplying research institutions and universities worldwide. 4.6 years with HHV, I worked in the manufacturing division, where I was involved in a broad range of technical and operational activities:

- Handled technical inquiries from HHV Ltd., UK (marketing office), and provided customized quotations and alternative product solutions.
- Collaborated closely with the design team to develop novel and cost-effective thin film coating systems tailored to customer needs.
- Participated in production planning, system testing, and ensured quality assurance based on client specifications.
- Supported the installation team during on-site system setup and commissioning.

I gained hands-on experience with a wide range of vacuum system components, including:

- Vacuum pumps, gauges, valves, leak detectors, and vacuum chambers.
- Thermal evaporation sources (resistive, electron beam, OLED effusion cells).
- Sputtering components (magnetron guns, RF/DC/pulsed DC power supplies, MFCs).

Worked extensively with Edwards vacuum coating systems including AUTO306, AUTO500, TF series (TF500–TF800), benchtop coaters, and glove box-integrated systems, focusing on process optimization and automation using PLC/PC controls.

Contributed to the design and integration of advanced substrate handling mechanisms for improved film quality and process versatility:

- Z-shift, rotation, tilting, RF/DC biasing, flipping, and temperature control for uniform and



dual-side film deposition.

Developed in-depth expertise in vacuum deposition techniques:

- Thermal & e-beam evaporation, OLED deposition
- RF/DC magnetron sputtering, including reactive sputtering
- PECVD (Plasma-Enhanced Chemical Vapor Deposition)
- RIE (Reactive Ion Etching) depositions
- PLD (Pulsed Laser Deposition) and glove box-integrated systems

This experience provided me with a comprehensive understanding of vacuum systems, thin film deposition, and equipment design and optimization, forming a strong foundation for my transition into advanced materials research and nanotechnology.

## TEACHING EXPERIENCE

### *Tutor, Sri Chaitanya Educational Institutions, India*

**Physics Tutor** (During 2007–2009) of physics for 1<sup>st</sup> and 2nd-year intermediate students at Sri Chaitanya Educational Institutions, Tirupati, Andhra Pradesh, India. I was taking experimental classes, conducting experiments, clarifying doubts, and evaluating exam papers.

Served as a **Physics Tutor** for 1st and 2nd-year intermediate (Senior Secondary Education) students, delivering both **theoretical instruction** and **practical laboratory sessions**.

*Responsibilities included:*

- Teaching core physics concepts and problem-solving strategies.
- Conducting **experimental classes**, guiding students through hands-on learning to reinforce theoretical understanding.
- Providing **individual doubt clarification** to support academic success.
- Designing and **evaluating examinations**, quizzes, and lab assessments to monitor student progress.

This role helped strengthen my communication, mentoring, and academic evaluation skills while fostering student engagement in foundational physics education.

### *Science Teacher, Zilla Parishad High School (ZPHS), Gangavaram, Chittoor, Andhra Pradesh, India.*

Worked as a Science Teacher under the Board of Secondary School Education, instructing students in 8th, 9th, and 10th standards. Key responsibilities included:

- Teaching general science subjects with a focus on physics, chemistry, and biology aligned

with the state curriculum.

- Designing and delivering lesson plans to enhance conceptual understanding and scientific thinking.
- Conducting classroom demonstrations and practical experiments to engage students in hands-on learning.
- Preparing students for board examinations, including administering tests, evaluating performance, and providing academic support.
- Inspire student interest in science by bridging theoretical knowledge with hands-on experiments and real-world relevance.

This role laid a strong foundation for my passion for teaching and mentoring, while improving my ability to explain complex scientific concepts in an accessible manner.

## **LIST OF PUBLICATIONS (IMPACT FACTOR AS PER 2025)**

### **2025**

- [21] **Kesama, M. R.**, Seongmin Seo, Ruixin Li, Anirudh S. Madhvacharyula, Alexander A. Swett, Yancheng Du, Friedrich C. Simmel, Jong Hyun Choi, A Nanoscale Jitterbug Transformer from DNA, manuscript writing stage and planning to submit to *Science* Journal.
- [20] **Kesama, M. R.**, Jeffery, and Jong Hyun Choi, Biomimetic Vesicle Systems for Rolling Circle Amplification & DNA Nanostructure Formation. Plan to submit *Angewandte Chemie*
- [19] M. H. Yen, **Kesama, M. R.**, J. H. Choi, and Kevin Solomon, Microbial Production of Custom DNA Staples for Nanoscale Origami or Bioproduction of DNA Origami Staples: A Step Toward Scalable DNA Nanotechnology.

### **2023**

- [18] **Kesama, M. R.**, & Kim, S., DNA-Nanocrystal Assemblies for Environmentally Responsive and Highly Efficient Energy Harvesting and Storage, *Advanced Science*, 10(8), 2206848. [[doi.org/10.1002/advs.202206848](https://doi.org/10.1002/advs.202206848)], Impact Factor: **14.1**
- [17] **Kesama, M. R.**, K. Samanth, S. Jeon, J. H. Jeong, & S. H. Park, Electrical Contact Effects of Flexible Self-Supporting DNA Thin Films for Storage Devices *Journal of Physics D: Applied Physics*, 56, 055401. [[doi.org/10.1088/1361-6463/acaabb](https://doi.org/10.1088/1361-6463/acaabb)], Impact Factor: **3.2**

### **2022**

- [16] Liu, X., Deng, Y., Zheng, L., **Kesama, M. R.**, Tang, C., & Zhu, Y. Engineering Low-Coordination Single-Atom Cobalt on Graphitic Carbon Nitride Catalyst for

Hydrogen Evolution, *ACS Catalysis*, 12, 5517–5526. [[doi.org/10.1021/acscatal.2c01253](https://doi.org/10.1021/acscatal.2c01253)], Impact Factor: **13.1**

[15] Samanth, K., Raut, S. A., Mariyappan, K., Nam, Y., Kesama, M. R., et al. Optoelectric and Photocatalytic Characteristics of DNA Thin Films Embedded with Transition Metal Ion-Doped ZnO Nanorods *Materials Chemistry and Physics*, 126135. [[doi.org/10.1016/j.matchemphys.2022.126135](https://doi.org/10.1016/j.matchemphys.2022.126135)], Impact Factor: **4.7**

## 2020

[14] Heo, C., Ha, T., You, C., Huynh, T., Lim, H., Kim, J., **Kesama, M. R.**, et al. Identifying Fibrillization State of A $\beta$  Protein via Near-Field THz Conductance Measurement, *ACS Nano*, 14, 6548–6558. [[doi.org/10.1021/acsnano.9b08572](https://doi.org/10.1021/acsnano.9b08572)], Impact Factor: **16.0**

[13] Kesama, M. R., Dugasani, S. R., Jung, S. G., Park, T., Gnapareddy, B., & Park, S. H. Band Gap, Dielectric Constant, and Susceptibility of DNA Layers as Controlled by Vanadium Ion Concentration, *Nanotechnology*, 31, 085705. [[doi.org/10.1088/1361-6528/ab53b0](https://doi.org/10.1088/1361-6528/ab53b0)], Impact Factor: **2.8**

## 2019

[12] Dugasani, S. R., Gnapareddy, B., **Kesama, M. R.**, & Park, S. H. Chemical and Physical Characteristics of Hydroxyl Group-Modified Multi-Walled Carbon Nanotube-Combined DNA Layers, *Journal of Physics D: Applied Physics*, 52, 415302. [[doi.org/10.1088/1361-6463/ab31c6](https://doi.org/10.1088/1361-6463/ab31c6)], Impact Factor: **3.2**

[11] Gnapareddy, B., Dugasani, S. R., **Kesama, M. R.**, Oh, K., & Park, S. H. Physical Characterization of Cytochrome C- and Vitamin B12-Doped Multilayer DNA Thin Films, *Materials Chemistry and Physics*, 237, 121869. [[doi.org/10.1016/j.matchemphys.2019.121869](https://doi.org/10.1016/j.matchemphys.2019.121869)], Impact Factor: **4.7**

[10] **Kesama, M. R.**, Dugasani, S. R., Gnapareddy, B., & Park, S. H. Spectroscopic and Capacitance Characteristics of DNA Thin Layers Embedded with Semiconducting ZnO and CuO Nanoparticles, *ACS Applied Electronic Materials*, 1, 991–1002. [[doi.org/10.1021/acsaelm.9b00172](https://doi.org/10.1021/acsaelm.9b00172)] Impact Factor: **4.7**

[9] Yoo, S., Dugasani, S. R., Chopade, P., **Kesama, M. R.**, Gnapareddy, B., & Park, S. H. Metal and Lanthanide Ion-Co-Doped Synthetic and Salmon DNA Thin Films, *ACS Omega*, 4, 6530–6537. [[doi.org/10.1021/acsomega.9b00559](https://doi.org/10.1021/acsomega.9b00559)], Impact Factor: **4.3**

[8] **Kesama, M. R.**, Dugasani, S. R., Jeong Cha, Y. J., Son, J., Gnapareddy, B., Yoo, S., Yoon, D. K., & Park, S. H. Optoelectronic and Mechanical Properties of Multiwall Carbon Nanotube

Integrated DNA Thin Films, *Nanotechnology*, 30, 245704. [[doi.org/10.1088/1361-6528/ab0b0f](https://doi.org/10.1088/1361-6528/ab0b0f)], Impact Factor: **2.8**

[7] Dugasani, S. R., Gnapareddy, B., **Kesama, M. R.**, Jeon, S., Jeong, J. H., & Park, S. H. Optoelectronic Properties of DNA Thin Films Implanted with Titania Nanoparticle-Coated Multiwalled Carbon Nanotubes, *AIP Advances*, 9, 015011. [<https://doi.org/10.1063/1.5063446>] Impact Factor: **1.4**

## 2018

[6] Dugasani, S. R., Gnapareddy, B., **Kesama, M. R.**, Ha, T. H., & Park, S. H. DNA and DNA–CTMA Composite Thin Films Embedded with Carboxyl Group-Modified Multi-Walled Carbon Nanotubes, *Journal of Industrial and Engineering Chemistry*, 68, 79–86. [[doi.org/10.1016/j.jiec.2018.07.031](https://doi.org/10.1016/j.jiec.2018.07.031)] Impact Factor: **6.0**

[5] **Kesama, M. R.**, Yun, B. K., Ha, T. H., Dugasani, S. R., Son, J., Kim, J. H., Jung, J. H., & Park, S. H. Magneto-Optical and Thermal Characteristics of Magnetite Nanoparticle-Embedded DNA and CTMA–DNA Thin Films, *Nanotechnology*, 29, 465703. [[doi.org/10.1088/1361-6528/aade31](https://doi.org/10.1088/1361-6528/aade31)], Impact Factor: **2.8**

[4] **Kesama, M. R.**, Yun, B. K., Dugasani, S. R., Jung, J. H., & Park, S. H. Enhancing the Electrical, Optical, and Magnetic Characteristics of DNA Thin Films Through Mn<sup>2+</sup> Fortification, *Colloids and Surfaces B: Biointerfaces*, 167, 197–205. [[doi.org/10.1016/j.colsurfb.2018.04.023](https://doi.org/10.1016/j.colsurfb.2018.04.023)] Impact Factor: **5.6**

## 2017

[3] Chopade, P., Dugasani, S. R., **Kesama, M. R.**, Yoo, S., Gnapareddy, B., Lee, Y. W., Jeon, S., Jeong, J. H., & Park, S. H. Phase, Current, Absorbance, and Photoluminescence of Double and Triple Metal Ion-Doped Synthetic and Salmon DNA Thin Films, *Nanotechnology*, 28, 405702. [[doi.org/10.1088/1361-6528/aa879b](https://doi.org/10.1088/1361-6528/aa879b)] Impact Factor: **2.8**

[2] Arasu, V., Dugasani, S. R., **Kesama, M. R.**, Chung, H. K., & Park, S. H. Luminophore Configuration and Concentration-Dependent Optoelectronic Characteristics of a Quantum Dot-Embedded DNA Hybrid Thin Film, *Scientific Reports*, 7, 11567. [[doi.org/10.1038/s41598-017-11797-7](https://doi.org/10.1038/s41598-017-11797-7)] Impact Factor: **3.9**

## 2016

[1] **Kesama, M. R.**, Dugasani, S. R., Yoo, S., Chopade, P., Gnapareddy, B., & Park, S. H. Morphological and Optoelectronic Characteristics of Double and Triple Lanthanide Ion-

Doped DNA Thin Films, *ACS Applied Materials & Interfaces*, 8, 14109–14117. [[doi.org/10.1021/acsami.6b02880](https://doi.org/10.1021/acsami.6b02880)], Impact Factor: **8.2**

## MANUSCRIPTS ARE COMPLETED

1. Mallikarjuna Reddy Kesama et al., “Bio-inspired, self-supporting, super-stretchable DNA hybrid thin film incorporated Al<sub>2</sub>O<sub>3</sub> nanowires, MWCNTs, CuO, Ni, ZnO, and Fe<sub>3</sub>O<sub>4</sub> nanoparticles for rollable storage devices and flexible UV photodetectors.
2. Mallikarjuna Reddy Kesama et al., Structural and morphological and electrochemical characteristics of monomer, oligomer, and fibrils for Amyloid beta protein to detect Alzheimer’s Disease.
3. Mallikarjuna Reddy Kesama et al., A review of non-invasive light stimulation approaches for breakthrough therapy of AD (Alzheimer’s) and PD (Perkinson) diseases.
4. Mallikarjuna Reddy Kasama et al., Distinctive Spectral Characteristics of MoS<sub>2</sub> and Riboflavin- Incorporated DNA Films.
5. Mallikarjuna Reddy Kasama et al., Indium tin oxide- and riboflavin-conjugated DNA layers exhibiting energy and charge transfer studied via. optoelectrical characterizations.
6. Mallikarjuna Reddy Kasama et al., Mass-production of surface-metalized DNA ferromagnetic fibers synthesized by anion-exchange and self-metallization strategy.
7. Mallikarjuna Reddy Kasama et al., Magnetic nanomaterials embedded DNA-free-standing multilayer thin film fabrication *via* drenching method for enhancing the superparamagnetic properties.
8. Mallikarjuna Reddy Kasama et al., Construction of nanomaterial embedded DNA biopolymer thin films for energy harvesting devices.

## PUBLICATION ANNEXURE & RESEARCH IDENTIFIERS

- ✚ Research publications — **18**
- ✚ Total impact factor Score — **104.3** (Average impact factor Score — **5.8**)
- ✚ Google Citations — **313** [h-index: **10** & i10-index: **10**]
- ✚ Conference presentations — **6** [**4** off International & **2** off National]
- ✚ Several manuscripts under review or preparation (as 1<sup>st</sup> and co-author)
- ✚ **ORCID iD:** 0000-0003-1708-5605, **Web of Science Researcher ID:** E-6325-2018
- ✚ **ResearchGate:** [www.researchgate.net/profile/Mallikarjuna-Reddy-Kesama](https://www.researchgate.net/profile/Mallikarjuna-Reddy-Kesama)
- ✚ **Google Scholar:** <https://scholar.google.co.kr/citations?user=6I9wLYgAAAAJ&hl=en>

## RESEARCH COLLABORATIONS

- ✚ University of Delaware, Department of Chemical & Biomolecular Engineering, USA
- ✚ Inha University, Incheon, South Korea
- ✚ Yonsei University, Seoul, South Korea
- ✚ Korea Advanced Institute of Science and Technology (KAIST), Daejeon, South Korea
- ✚ Sungkyunkwan University, Department of Physics, Suwon, South Korea
- ✚ Chonbuk National University, Semiconductor Physics Research Center, South Korea
- ✚ Chungnam National University, Department of Physics, Daejeon, South Korea
- ✚ Electronics and Photonics Research Institute, National Institute of Advanced Industrial Science and Technology (AIST), Japan
- ✚ Indian Institute of Science (IISc), Bangalore, India
- ✚ Ajou University, Biomaterial Optics and Electronics Lab (BOEL), Suwon, South Korea
- ✚ Indian Institute of Chemical Technology (CSIR-IICT), Hyderabad, India
- ✚ Indian Institute of Information Technology, Design and Manufacturing (IIITDM), Kancheepuram, Chennai, India

## INTERNATIONAL AND DOMESTIC CONFERENCES / SYMPOSIA

- ✚ **Frontiers in Materials for Technological Applications (FIMTA 2020)**  
*CSIR–Institute of Minerals and Materials Technology, Bhubaneswar, India | August 4–6, 2020.* Attended the conference focusing on advanced materials and their technological applications.
- ✚ **Korean Physical Society (KPS) Spring Meeting, Korea | April 24–26, 2019**  
**Presentation:** *Physical Properties of MWCNT-Integrated DNA Thin Films*  
🏆 **Best Poster Award**
- ✚ **Nano Korea 2017, Seoul, South Korea | July 13–15, 2017**  
**Presentation:** *Optoelectronic and Magnetic Properties of Mn<sup>2+</sup>-Modified DNA Thin Films*
- ✚ **Nano Korea 2016, Seoul, South Korea | July 13–15, 2016**  
**Presentation:** *Morphological and Optoelectronic Characteristics of Double and Triple Lanthanide Ion-Doped DNA Thin Films*
- ✚ **6th India Nano Conference**  
*Organized by the Department of Electronics, IT, BT, and S&T, Government of Karnataka | Bangalore, India | December 4–6, 2013*


### **5th Bangalore Nano Conference**

*Organized by the Department of Electronics, IT, BT, and S&T, Government of Karnataka | Bangalore, India | December 5–7, 2012*

### **Emerging Materials, Devices and Technologies (EMDT) Conference**

*Sri Venkateswara University, Tirupati, India | April 24–25, 2009*


## **INVITED TALKS**


 Vellore Institute of Technology (VIT) | April 7, 2023

 Sri Vani Degree College, Palamaner, Chittoor (*Affiliated to Sri Venkateswara University, Tirupati, India.*) | August 25, 2022

## **ADDITIONAL ACTIVITIES - MENTORSHIP & OUTREACH**


### **PH.D. MENTORSHIP**

 Provided comprehensive support to master's and Ph.D. students at Ajou University, including sample preparation, characterization, data analysis, manuscript and thesis writing.

 Mentored two graduate students at Sungkyunkwan University, South Korea, in experimental analysis and publication preparation.


### **VOLUNTEER WORK**


 Organized community outreach programs to boost volunteer engagement.


 Created onboarding materials to align new volunteers with organizational goals.


 Led workshops focused on skill development and team collaboration.


## **INTERESTS & ENGAGEMENT**

 Mentoring in STEM education and student research.


 Tech enthusiast, passionate about emerging technologies.

 Reading, 3D modeling/printing, creative writing.

 Personal growth and self-improvement.

 Actively engaged in academic conferences, invited talks, manuscript reviewing, and collaborative research discussions.

## **GENERAL DEMOGRAPHIC AND CONTACT INFORMATION**

 **Date and place of Birth** — 6<sup>th</sup> December 1985, #3-31/1, Kunripalli (Village), Maredupalli (Post), Palamaner (Taluk), Chittoor (District), Andhra Pradesh (State) - 517408, India.

- ✚ **Home Address in India** — #3, 1<sup>st</sup> Floor, Jayaram Building, Hanumanthappa Compound, 2<sup>nd</sup> Main, Mathikere, Bangalore – 560054, Karnataka, India.
- ✚ **Present Address in USA** — #2550, Yeager Road, 2-11, Beau Jardin Apartment, West Lafayette, Indiana, 47906, USA.
- ✚ **Gender** — Male
- ✚ **Nationality** — Indian
- ✚ **Marital Status** — Married
- ✚ **Spouse** — Honaganahalli Linga Reddy Veena (H L Veena)
- ✚ **Children** — Kesama Mahonnath Reddy (Boy) and Kesama Sathvika Reddy (Girl)

## POTENTIAL REFERENCES

### ✚ **Prof. Sung Ha Park (Ph.D. Advisor)**

Professor, Dept. of Physics & Sungkyunkwan Advanced Institute of Nanotechnology (SAINT), Sungkyunkwan University, Suwon, 16419, South Korea, Phone: 82-31-299-4544, Mobile: 82-10-5091-2045, Fax: 82-31-290-7055. Email: [sunghapark@skku.edu](mailto:sunghapark@skku.edu)

### ✚ **Prof. Jong Hyun Choi**

Professor, School of Mechanical Engineering, Purdue University, 585 Purdue Mall, West Lafayette, Indiana, 47907-2088, USA. Email ID: [jchoi@purdue.edu](mailto:jchoi@purdue.edu)  
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### ✚ **Prof. Y. Ashok Kumar Reddy**

Assistant Professor of Physics, Indian Institute of Information Technology Design & Manufacturing (IIITDM) Kancheepuram, (Institute of National Importance under MHRD, Govt. of India), Off Vandalur-Kelambakkam Road, Melakottaiyur, Chennai, Tamil Nadu, India-600127. Phone: +91-44 2747 6369, Email ID: [akreddy@iiitdm.ac.in](mailto:akreddy@iiitdm.ac.in)

## DECLARATION

I hereby declare that the above-written particulars are true to the best of my knowledge and belief.

*K. Mallikarjuna Reddy...*

**MALLIKARJUNA REDDY KESAMA**