Tarun Mateti

Driving Innovation in Healthcare and Medicine with AI | Cancer & Materials Researcher
Master of Science (M.S.) Candidate in Mechanical Engineering & Materials Science
Department of Mechanical Engineering & Materials Science
Yale School of Engineering & Applied Science, Yale University

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Education

- **Yale School of Engineering & Applied Science, Yale University** — New Haven, United States of America
  Master of Science (Mechanical Engineering & Materials Science) — *August 2024 – May 2025*
- **Manipal Institute of Technology, Manipal Academy of Higher Education** — Manipal, India
  Bachelor of Technology (Chemical Engineering); CGPA: 7.50/10, GPA: 3.31/4.0 (WES) — *July 2017 – August 2021*
  Minor Specialization: Digital Marketing
- **S. R. M. Junior College** — Hyderabad, India
  Grade 12 (Telangana State Board of Intermediate Education); Marks: 947/1000 — *June 2016 – April 2017*
- **Johnson Grammar School** — Hyderabad, India
  Grade 10 (Central Board of Secondary Education); CGPA: 9.8/10 — *June 2014 – May 2015*

Work Experience

- **Department of Bioengineering, Indian Institute of Science** — Bangalore, India
  (Formerly: Center for BioSystems Science and Engineering) *Research Intern, PI: Mohit Kumar Jolly* — *August 2023 – March 2024*
  - **Cancer Biology & Bioinformatics research**
    - Identifying heterogeneous cells in glioblastoma datasets using Seurat
    - Took in-person courses on *Mathematical methods for bioengineering* and *Systems biology*
- **Materials Research Centre, Indian Institute of Science** — Bangalore, India
  Research Intern, PI: Subinoy Rana — *February 2023 – July 2023*
  - **Materials research**
    - Synthesis of nanozymes for catalysis, gels for biomedical science, and gas-sensing systems for disease detection
- **National Bioinformatics Infrastructure Sweden** — Online
  Project Associate, PI: Prasoon Agarwal — *March 2022 – Present*
  - **Bioinformatics research**
    - Identifying heterogeneous cells in glioblastoma datasets using Seurat
- **Cognizant** — Hyderabad, India
  Programmer Analyst — *August 2021 – January 2023*
  - **Quality Assurance**
    - Performed tests to investigate and fix bugs occurring in the quality assurance and production environments and maintained test logs and cases for CoreLogic's VectorSecurities application website and client-capital markets
    - Experience with database querying tools, SQL Server Management Studio, and the Microstrategy application
- **Manipal Institute of Technology, Manipal Academy of Higher Education** — Manipal, India
  Project Associate, PI: Gurumurthy S C — *December 2020 – July 2021*
  - **Materials research**
    - Worked on my B. Tech thesis project in the Nano and Functional Materials Lab
    - Investigated the effect of incorporating Ag, ZnO, TiO2, and GO nanostructures into a polymethyl methacrylate (PMMA) matrix by evaluating the system's flexural and compressive strength, surface roughness, and antibacterial activity against Escherichia coli, Staphylococcus aureus, Staphylococcus epidermidis, Candida albicans, and Streptococcus mutans, for use in dentures
- **Manipal Institute of Technology, Manipal Academy of Higher Education** — Manipal, India
  Research Trainee, PI: Anindita Laha — *January 2019 – May 2019*
  - **Cancer Biology & Materials research**
    - Worked on nanofiber drug delivery for chemotherapy

- **Manipal Institute of Technology, Manipal Academy of Higher Education** Manipal, India
  Independent Researcher, PI: Anindita, Goutam, Seeram, Gurumurthy, Praveen *May 2018 – August 2021*
  - **Cancer & Materials research**
    - Worked on ***nanobiotechnology***: drug delivery, tissue engineering, nanoscience, materials informatics, cancer biology, and bioinformatics
    - Worked as a research assistant/mentor to peers and juniors trying out research for the first time and those joining our group to work on projects

Publications

- Reteesha Ramdani, Anusha M. Rao, Mishal Pokharel, Tarun Mateti, K. Likhith, Malti Kumari, S. Supriya Bhatt, Manasa Nune, and Goutam Thakur, ***Curcumin-laden crosslinked chitosan–PVA films: The synergistic impact of genipin and curcumin on accelerating wound closure***, JOM, 2023, doi: 10.1007/s11837-023-06123-8 (**Co-first author**, **Impact Factor: 2.6**)
- Tarun Mateti, Likhith K., Anindita Laha, and Goutam Thakur, ***A critical analysis of the recent developments in multi-stimuli responsive smart hydrogels for cancer treatment***, Current Opinion in Biomedical Engineering, 2022, doi: 10.1016/j.cobme.2022.100424 (**Co-first author**, **Impact Factor: 3.9**)
- Ruchira Panchal, Tarun Mateti, K. Likhith, Fiona Concy Rodrigues, and Goutam Thakur, ***Genipin cross-linked chitosan–PVA composite films: An investigation on the impact of cross-linking on accelerating wound healing***, Reactive and Functional Polymers, 2022, doi: 10.1016/j.reactfunctpolym.2022.105339 (**Second author**, **Impact Factor: 5.1**)
- Tarun Mateti, Anindita Laha, and Pushpalatha Shenoy, ***Artificial meat industry: Production methodology, challenges, and future***, JOM, 2022, doi: 10.1007/s11837-022-05316-x (**First author**, **Impact Factor: 2.6**)
- Souradeep Mitra, Tarun Mateti, Seeram Ramakrishna, and Anindita Laha, ***A review on curcumin-loaded electrospun nanofibers and their application in modern medicine***, JOM, 2022, doi: 10.1007/s11837-022-05180-9 (**Second author**, **Impact Factor: 2.6**)
- Tarun Mateti, Surabhi Aswath, Anoop Kishore Vatti, Agneya Kamath, and Anindita Laha, ***A review on allopathic and herbal nanofibrous drug delivery vehicles for cancer treatments***, Biotechnology Reports, 2021, doi: 10.1016/j.btre.2021.e00663 (**Co-first author**, **CiteScore: 12.8**)
- Tarun Mateti, Surabhi Aswath, and Anindita Laha, ***Recent advances in electrospun allopathic anti-cancerous drug delivery systems***, Materials Today: Proceedings, 2021, doi: 10.1016/j.matpr.2021.01.077 (**First author**, **CiteScore: 3.2**)
- K. S. Pavithra, S. C. Gurumurthy, M. P. Yashoda, Tarun Mateti, Koduri Ramam, Roopa Nayak, and M. S. Murari, ***Polymer-dispersant-stabilized Ag nanofluids for heat transfer applications***, Journal of Thermal Analysis and Calorimetry, 2021, doi: 10.1007/s10973-020-10064-8 (**Fourth author**, **Impact Factor: 4.4**)

Book Chapters

- Tarun Mateti, Shikha Jain, Trisha Biswas, Amrita Dam, Anindita Laha, and Goutam Thakur, ***Nanotechnology for diagnosis and treatment of dental and orthopedic diseases***, Emerging Nanotechnologies for Medical Applications, Elsevier, 2023, doi: 10.1016/B978-0-323-91182-5.00003-6 (**First author**)
- Tarun Mateti, Shikha Jain, L. Ananda Shruthi, Anindita Laha, and Goutam Thakur, ***An overview of the advances in the 3D printing technology***, 3D Printing Technology for Water Treatment Applications, Elsevier, 2023, doi: 10.1016/B978-0-323-99861-1.00002-3 (**Co-first author**)
- Tarun Mateti, Rohit Kapila, Smarak Islam Chaudhury, Likhith K., and Goutam Thakur, ***Quantum Dots: The Next Generation Candidate for Biomedical Imaging***, Applications of Nanotechnology in Biomedical Engineering, Taylor & Francis (Accepted, **Co-first author**, **Correspondence: Goutam Thakur**)
- Tarun Mateti, Malti Kumari, Savita, Smarak Islam Chaudhury, Likhith K., Goutam Thakur, and Anindita Laha, ***Current advancements in bio-separation of industrial wastes: Environment-friendly recovery of high-valued metal ions***, Taylor & Francis (Accepted, **Co-first author**, **Correspondence: Anindita Laha**)
- Tarun Mateti, Malti Kumari, Savita, Smarak Islam Chaudhury, Likhith K., and Goutam Thakur, ***Modified Starches Used in the Food Industry and Biomedical Applications***, Advanced Research in Starch, Springer, 2024, doi: 10.1007/978-981-99-9527-1_9 (**Co-first author**)

Preprints

- Tarun Mateti, Tummala Venkat, Y. Veera Raghav Reddy, Rekha Gopalkrishna Pai, Praveen Kumar, and Prasoon Agarwal, ***A polynomial equation devised using machine learning to predict the antibacterial activity of silver nanoparticles***, ChemRxiv, 2023, doi: 10.26434/chemrxiv-2023-vc1x4
- Atharva Markale, Tarun Mateti, Likhith K., S. Supriya Bhatt, Rajesh K. M., Vishwanath Managuli, Manasa Nune, Ritu Raval, Pradeep Kumar, Goutam Thakur, ***Fostering K-carrageenan Hydrogels with the Power of Natural Crosslinkers: A Comparison between Tender Coconut Water and Potassium Chloride for Antibacterial Therapy***, ChemRxiv, 2023, doi: 10.26434/chemrxiv-2023-q7st6
- Punyashraya Mahapatra, K. Likhith, Tarun Mateti, Uroolee Changmai, Praveengouda Patil, Anil Kumar NV, Vishwanath Managuli, Pradeep Kumar, and Goutam Thakur, ***Physicochemical investigations of nanoemulsified, curcumin-loaded, crosslinked k-carrageenan hydrogels***, ChemRxiv, 2023, doi: 10.26434/chemrxiv-2023-359kh

- Tarun Mateti, Venkat Tummala, T. G. Aditya, K. Likhith, Goutam Thakur, Seeram Ramakrishna, and Anindita Laha, ***Antibacterial Nanomaterials for Dental Implants: From Coatings to Surface Modifications***, ChemRxiv, 2023, doi: 10.26434/chemrxiv-2023-fnnvp-v2
- Parkhi Mathur, Pradeep Sherigar, Kishore Ginjupalli, and Tarun Mateti, ***Effect of bergamot oil on the physicomechanical properties of PMMA: An in vitro study***, ChemRxiv, 2023, doi: 10.26434/chemrxiv-2023-94dsh
- Uroolee Changmai, Likhith K., Tarun Mateti, Malti Kumari, Savita, Nagalakshmi Narasimhaswamy, and Goutam Thakur, ***Evaluation of the antibacterial activity of silver-doped curcumin-loaded zeolitic imidazolate framework-8 against methicillin-sensitive and -resistant Staphylococcus aureus***, ChemRxiv, 2023, doi: 10.26434/chemrxiv-2023-qx0q5
- Vivek Sharma, Kunal Pal, Tarun Mateti, and Goutam Thakur, ***Fabrication and characterization of Tamarind gum-Hydroxypropyl beta cyclodextrin based semi-IPN gel and In-vitro release of Moxifloxacin***, ChemRxiv, 2023, doi: 10.26434/chemrxiv-2023-hd7sq
- Krizma Singh, Gayathri Ajith Chakkadath, Tarun Mateti, Likhith K., Fiona Concy Rodriguez, Goutam Thakur, and Kunal Pal, ***Ultrasound-guided Drug Delivery and Tissue Engineering***, ChemRxiv, 2023, doi: 10.26434/chemrxiv-2023-tks89
- Uroolee Changmai, Likhith K., Tarun Mateti, and Goutam Thakur, ***Effect of Curcumin-adsorbed ZnO Nanoparticles on the Physical, Mechanical, and Antibacterial Properties of K-carrageenan Hydrogels***, ChemRxiv, 2023, doi: 10.26434/chemrxiv-2023-8j991

Grants

- Student Projects Programme, Government of Karnataka, '***A physicochemical and image-based artificial intelligence approach in wound assessment using curcumin-laden surface-engineered Zn-MOF impregnated in bioresorbable nanofiber scaffolds***.' (Link, **Correspondence: Goutam Thakur**)
- MAC ID Seed Grant, McGill University, '***Anti-biofilm investigation of transition metal carbide nanocomposites encumbered biopolymer based fibrous adhesive mats for tackling biofilm producing urological bacteria from HAI***.' (Link, **Correspondence: Goutam Thakur**)

Conferences

- Tarun Mateti, Tummala Venkat, Y. Veera Raghav Reddy, Rekha Gopalkrishna Pai, Praveen Kumar, and Prasoon Agarwal, ***A polynomial equation devised using machine learning to predict the antibacterial activity of silver nanoparticles***, International Conference on Nanoscience and Nanotechnology, Manipal Academy of Higher Education, Manipal, Karnataka, India
- Likhith K., Tarun Mateti, and Goutam Thakur, ***Curcumin-adsorbed Zeolitic Imidazolate Frameworks in Electrospun Bioresorbable Nanofibers as a Drug Delivery System for Biomedical Applications: Synthesis and Antibacterial Potency against Staphylococcus aureus***, Conference on "Nanobiotechnology: Beyond the Conventional", Indian Institute of Science, Bangalore, 2023
- Tarun Mateti, Surabhi Aswath, and Anindita Laha, ***Antibacterial Performance/Influence of Nanostructures in Dentistry***, International Virtual Conference on Biomaterial-Based Therapeutics, Engineering and Medicine (BIOTEM-2021), 2021 (Link)
- Tarun Mateti, Surabhi Aswath, and Anindita Laha, ***Recent Advances in Electrospun Allopathic Anti-Cancerous Drug Delivery Systems***, International Conference on Cutting-edge Research in Material Science and Chemistry (CRMSC-2021), 2021 (Link)
- Tarun Mateti, Pushpalatha Shenoy, and Anindita Laha, ***Recent Developments in Cultured Meat Industry: Production Methodology, Challenges, and Future***, Indian Chemical Engineering Congress (CHEMCON-2020), 2020 (Link)
- Indira Hiremath, Anusha Dsouza, Smita M. Nyamgoudar, Ananya B. N., Tarun Mateti, B. S. Nagaraja, and Gurumurthy S C, ***Metal-Semiconductor Nanocomposites for Photocatalytic Activity***, International Conference on Recent Advances in Materials Science (ICRAMS 2020), Central University of Tamil Nadu, Thiruvarur, Tamil Nadu, India, 2020 (Link)
- Anusha Dsouza, Indira Hiremath, Smita M. Nyamgoudar, Ananya B. N., Tarun Mateti, Shridhar Mundinamani, and Gurumurthy S C, ***Bimetallic Nanoparticles for Photocatalytic Application***, International Conference on Recent Advances in Materials Science (ICRAMS 2020), Central University of Tamil Nadu, Thiruvarur, Tamil Nadu, India, 2020 (Link)

Projects in Progress

- **Review of applications of herbal extracts in electrospun nanofibers**, Correspondence: Anindita Laha, Seeram Ramakrishna
- **A systematic review of peptide nanofibers versus polymer nanofibers for chemotherapy—A Major Test of Strength**, Correspondence: Anindita Laha, Seeram Ramakrishna
- **Curcumin-adsorbed zeolitic imidazolate framework-8 in gelatin–carrageenan cryogels for biomedical applications**, Correspondence: Goutam Thakur (To be on ChemRxiv)
- **Development of curcumin adsorbed copper oxide nanoparticles impregnated in gelatin–chitosan cryogels for biomedical applications**, Correspondence: Goutam Thakur (To be on ChemRxiv)
- **Fabrication of 3D Printed Polymer Based Microneedles: Optimization and Characterization**, Correspondence: Goutam Thakur (Manuscript submitted to 'Chemical Papers' journal)
- **Recent Studies on the efficiency of electrospun nanofibers for Ocular Drug Delivery**, Correspondence: Anindita Laha, Seeram Ramakrishna
- **Curcumin-adsorbed Zeolitic Imidazolate Frameworks in Electrospun Bioresorbable Nanofibers as a Drug Delivery System for Biomedical Applications: Synthesis and Antibacterial Potency against Staphylococcus aureus**, Correspondence: Goutam Thakur

- **A physicochemical and image based artificial intelligence approach in wound assessment using curcumin-laden surface-engineered Zn MOFs impregnated in bioresorbable nanofiber scaffolds**, Correspondence: Goutam Thakur
- **In vivo, in-vitro and physiochemical studies of hydroxyapatite nanoparticle-enriched silk fibroin/PCL-based nanofibers for bone tissue engineering**, Correspondence: Goutam Thakur
- **Fabrication of surface-engineered, curcumin-loaded cyclodextrin-based metal-organic frameworks as a topical spray to impede surgical site infections and promote wound healing**, Correspondence: Goutam Thakur
- **A critical review of RNAi (RNA interference) Nanotherapeutics for Treatment of Glioblastoma**, Correspondence: Praveen Kumar
- **Genetic Biomarkers for Predicting Drug Resistance during Anti-cancer Therapy**, Correspondence: Tarun Mateti, Praveen Kumar
- **Single-cell genome sequencing using Seurat**, Correspondence: Prasoon Agarwal

Skills

- **Laboratory**: Materials synthesis (*0D, 1D, 2D nanostructures, hydrogels, thin films, cryogels, microneedles, interpenetrating polymer networks, nanozymes, etc.*), Wet lab assays (*drug release, photocatalytic, swelling and degradation, antibacterial, cell cytotoxicity, live–dead imaging, wound healing, histopathology, cell proliferation, molecular experiments, etc.*), Materials characterization (*UV–Vis, FTIR, SEM, EDS, TGA, UTM, XRD, DLS, BET, zeta potential, etc.*)
- **Computational proficiency**: Machine learning (Python, R, MATLAB), Deep learning (Python, R), Computational biology (Seurat for single-cell genomics)
- **Science communication**: Blender, Adobe Illustrator, Adobe After Effects, Adobe InDesign, Adobe Photoshop, Adobe Premiere Pro, Inkscape, GIMP, Canva, Scientific writing, Presentation skills
- **Data analytics and visualization**: OriginPro, ChemDraw, ImageJ, Tableau, Microsoft Excel, Microsoft Powerpoint
- **Programming languages**: C, C++, SQL, PL/SQL, Java, LaTeX
- **Web Development**: HTML, CSS, JavaScript
- **Applications**: AutoCAD, Eclipse IDE, Visual Studio, Anaconda, RStudio, UCSF Chimera, X'Pert HighScore, Gwyddion, Endnote, Mendeley

Certifications

- **Online**
  Offered through Coursera, edX, and Scidart Academy
  - **Specializations**
    - **Machine Learning**, Stanford University & DeepLearning.AI (Link)
    - **Deep Learning**, DeepLearning.AI (Link)
    - **Cancer Biology**, Johns Hopkins University (Link)
    - **Genomic Data Science**, Johns Hopkins University (Link)
    - **AI in Healthcare**, Stanford University (Ongoing)
    - **AI for Medicine**, DeepLearning.AI (Ongoing)
  - **Courses**
    - **Writing in the Sciences**, Stanford University (Link)
    - **Machine Learning** (*using MATLAB*), Stanford University (Link)
    - **Introduction to Systematic Review and Meta-Analysis**, Johns Hopkins University (Link)
    - **Nanotechnology: A Maker's Course**, Duke University (Link)
    - **The Art and Science of Searching in Systematic Reviews**, National University of Singapore (Link)
    - **3D Illustration for Science Communication Using Blender**, Scidart Academy (Link)
    - **3-Month Scientific Illustration Course**, Scidart Academy (Link)
    - **Fundamentals of Graphic Design**, California Institute of the Arts (Ongoing)
    - **Biomedical Visualisation**, University of Glasgow (Ongoing)
    - **3D Data Visualization for Science Communication**, University of Illinois at Urbana-Champaign (Ongoing)
    - **NewcastleX: Drawing Nature, Science and Culture: Natural History Illustration 101**, The University of Newcastle, Australia (Ongoing)
- **Workshops**
  Hands-on learning
  - **Online**
    - **Data Analysis using Excel**, Manipal Academy of Higher Education (Link)
    - **Data Visualization using Tableau**, Manipal Academy of Higher Education (Link)
    - **Drug Design, Discovery & Developmental Studies**, Manipal Academy of Higher Education (Link)
    - **Python Programming**, Manipal Academy of Higher Education (Link)
  - **In-person**
    - **Advancing your Research with 3D Bioprinting**, Indian Institute of Science (Link)
    - ***Nature masterclass* 'Getting Published: Effectively Communicating Your Research'**, Manipal Academy of Higher Education (Link)

Social Work & Extra Curricular Activities

- Participated in cleanup drives, blood donation camps, and marathons at Manipal Academy of Higher Education, where the fund generated was used to uplift the underprivileged
- Demonstrated the research theme of my group's work at Indian Institute of Science (IISc) on its Open day
- Founder and General Secretary of Manipal Institute of Technology's Chess Club, in which I organized tournaments, workshops, and training camps
- Represented Manipal Academy of Higher Education in South Zone Inter-University National Chess tournaments
- Captain of Manipal Institute of Technology Chess team
- Participated and won many chess tournaments for Manipal Institute of Technology
- Organizer of Chemical Engineering department symposium 'CHEMIGNITE' at Manipal Institute of Technology
- Paper Presentation Head during TechTatva: The National Technical Festival of Manipal Institute of Technology
- Sports Coordinator during Revels: The National Cultural and Sports Fest of Manipal Institute of Technology
- Took tuition classes for school subjects and chess for school-going kids

Awards

- Secured School Rank 1 in International Mathematics, National Science, International English, and National Cyber Olympiads
- Winner of many district open chess tournaments
- Winner of the Telangana State Chess Championship
- Placed 12th (Open) in the National School Chess Championship 2016, at Nagpur, India
- Winner of the Indian Institute of Science Intra- and Inter-department Chess Championship

References

- **Dr. Anindita Laha**
  Assistant Professor
  Department of Chemical Engineering, Calcutta Institute of Technology, MAKAUT
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  Phone: +91 868-867-0961

- **Professor Goutam Thakur**
  Professor
  Department of Biomedical Engineering, Manipal Institute of Technology, Manipal Academy of Higher Education
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- **Professor Seeram Ramakrishna, FREng, Everest Chair**
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- **Dr. Praveen Kumar**
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- **Dr. Prasoon Agarwal**
  Bioinformatics Scientist
  National Bioinformatics Infrastructure Sweden
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- **Dr. Subinoy Rana**
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  Materials Research Centre, Indian Institute of Science
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- **Dr. Mohit Kumar Jolly**
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