

Experimental Biotechnology Internship

Advanced Focussed Areas for Interns in Experimental Biotechnology Internships

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Fundamentals of Experimental Biotechnology

- Introduction to Biotechnology and Molecular Biology
- Genetic Engineering and Gene Editing
- Recombinant DNA Technology
- CRISPR-Cas Systems and Applications
- Cloning and Expression of Recombinant Proteins
- o Gene Silencing and RNA Interference
- Biotechnological Tools and Techniques
- Microbial Biotechnology and Metabolic Engineering
- Applications of Biotechnology in Medicine and Industry
- Ethics and Regulation in Biotechnology

• Advanced Genetic Engineering Techniques

- CRISPR-Cas9 and Genome Editing
- Site-Directed Mutagenesis
- Gene Knockout and Knockin Strategies
- o Transgenic Animals and Plants
- o Gene Therapy and Genetic Engineering
- Stem Cell Technology and Regenerative Medicine
- Functional Genomics and Transcriptomics
- Epigenetic Engineering and Applications
- Gene Drives and Synthetic Biology
- Future Directions in Genetic Engineering

• Synthetic Biology and Bioengineering

- Principles of Synthetic Biology
- o Design and Construction of Genetic Circuits
- Metabolic Pathway Engineering
- Biobricks and Standardized Parts
- Biosensors and Diagnostic Devices
- Microbial Cell Factories and Production Systems
- o Artificial Cells and Minimal Genomes
- o Bioinformatics and Computational Biology
- Applications in Biomanufacturing and Biopharmaceuticals

• Future Trends in Synthetic Biology

• Experimental Techniques in Biotechnology

- DNA and RNA Extraction and Purification
- PCR and qPCR Techniques
- Gel Electrophoresis and Blotting Methods
- Protein Expression and Purification
- Enzyme Assays and Activity Analysis
- o Cell Culture and Tissue Engineering
- Microscopy and Imaging Techniques
- High-Throughput Screening and Assays
- Flow Cytometry and Cell Sorting
- Future Directions in Experimental Techniques

• Future Directions and Emerging Trends

- Innovations in Experimental Biotechnology
- Role of Biotechnology in Precision Medicine
- Emerging Applications in Biotechnology
- Global Trends in Biotechnology Research
- Future of Biotechnology in Healthcare and Industry
- Ethics and Regulation in Experimental Biotechnology
- Future Research Priorities in Biotechnology
- Impact of Biotechnology on Society
- Public Engagement and Education in Biotechnology
- o Integration of Biotechnology with AI and Data Science

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