

Fatemeh (Fateme) Frootan

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Scientist – Molecular Biology | Gene & Protein Engineering | Directed Evolution

Innovative molecular biologist with PhD in Bioengineering and postdoctoral expertise in recombinant protein and enzyme engineering. Experienced in genetic engineering, molecular cloning, library design, and in vitro assay development. Adept at integrating experimental and computational approaches for enzyme optimization and sequence-function analysis. Passionate about leveraging molecular tools to advance gene therapy and genome editing technologies.

CORE COMPETENCIES

- Directed Evolution & Enzyme Engineering – design and optimization of enzyme variants
- Molecular Cloning & Expression Systems – bacterial, plant, and eukaryotic hosts
- NGS-Based Readouts – library generation, sequencing, and data interpretation
- Protein Characterization – biochemical and functional in vitro assays
- Bioinformatics & Computational Biology – sequence analysis, structural modeling, molecular dynamics
- Documentation & Communication – scientific writing, IP awareness, cross-functional collaboration

SELECTED EXPERIENCE

R&D; Director – Maya Milk (Turkey, 2022–2025)

- Led molecular biology and protein engineering projects on recombinant milk proteins and engineered peptides.
- Designed chimeric GLP peptides and optimized their expression for functional screening.
- Managed R&D; team integrating bioinformatics, cell culture, and analytical workflows.

Founder & Bioinformatics Supervisor – Genesabz Co. (Iran, 2020–Present)

- Developed antigen gene libraries and recombinant expression systems for eukaryotic and prokaryotic hosts.
- Built bioinformatics pipelines for NGS-informed variant screening and protein design.
- Supervised laboratory teams performing genetic transformation and protein expression analyses.

Postdoctoral Researcher – NIGEB (Iran, 2016–2020)

- Engineered recombinant immunogens and optimized gene delivery into model organisms.
- Designed transformation vectors and developed in vitro assays for protein characterization.
- Collaborated in multidisciplinary research bridging molecular biology, immunoinformatics, and plant biotechnology.

Advisor & Lecturer – Universities & Biotech Startups (2016–2023)

- Delivered lectures in genetics, molecular biology, and bioinformatics.
- Provided R&D; mentorship to biotechnology startups on upstream processing and product development.

EDUCATION

Postdoc, Medical Biotechnology – NIGEB, Tehran, Iran

Ph.D., Bioengineering (Biotechnology) – Yildiz Technical University, Istanbul, Turkey

M.Sc., Molecular Biology & Genetics – Yildiz Technical University, Istanbul, Turkey

SELECTED PUBLICATIONS

- Current Nanoscience (2025) – Cytotoxicity of chitosan-encapsulated Ricin-Herceptin immunotoxin nanoparticles.
- Frontiers in Plant Science (2022) – DNA barcoding and biomass analysis of native duckweed species.
- Journal of Applied Biotechnology Reports (2024) – Recombinant chimeric protein expression in *Nicotiana tabacum*.
- Journal of Biotechnology (Elsevier, 2015) – Microbial production of essential macronutrients for hydroponic

systems.

TECHNICAL HIGHLIGHTS

PCR, cloning, vector construction, mutagenesis, SDS-PAGE, Western blot
Gene library synthesis and screening
DNA/RNA extraction and sequencing preparation
Protein purification and enzyme assay development
Bioinformatics: Linux, GROMACS, MATLAB, Python, molecular docking, sequence alignment

LANGUAGES

English (Fluent) | Turkish (Fluent) | Persian (Native) | French (Basic, improving)

PROFESSIONAL AFFILIATIONS

European Biotechnology Thematic Network (EBTNA)
Turkish Proteomix Association (TuPA)
Iranian Genetics Society

References

Available upon request.