



Wolfson Department of Chemical Engineering Seminar

Monday, November 18th, 2024 at 11:00

Zoom: <https://technion.zoom.us/j/96298325147>

**Studying Automated Experimental Techniques in Nanoparticle
Synthesis for RNA Delivery**

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PhD Mid Seminar

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The COVID-19 pandemic challenged numerous institutions in the search for solutions within different areas of academia, both in education and experimentation. The integration of robotics has significantly advanced experimental techniques in lipid nanoparticle synthesis, especially for mRNA delivery applications. Automated liquid handlers enable high-precision, high-throughput synthesis with minimal human error, greatly enhancing the efficiency of research in nanoparticle engineering. The robot can be utilized and tailored to perform numerous experiments and multiple screens allowing greater and more efficient data collection. By applying cutting-edge tools and automated machinery, experiments can be performed remotely using applications allowing users to connect to robots from any part of the world using a computer or a smartphone to monitor the experiment and get results. Despite the fact that theoretical learning is fairly easily replicated via online platforms, experimentation and practical skills can only be gained by in-person and hands-on approaches in modern schools and universities. By collaborating with Faculty of Education, we introduced "Robiochemistry", which is an interdisciplinary educational project that teaches students to the subjects of nanotechnology with an inclination to robotics. We introduced the course to an Israeli high school, as well as institutions in developing countries relevant to students with a passion for computation and fundamental sciences. As a result, while students learned the academic basis behind nanotechnology, they were also able to practice and perform experiments using an automated liquid handler. At the end of this semester-long course, the students created their own academic posters displaying their results and relevant conclusions. Moreover, students also got to experience the way in which science and research is carried out in modern laboratories that specialize in nanoparticle engineering methods and their subsequent analysis. This approach not only enhances students' understanding of nanotechnology but also prepares them for future work in research environments. Overall, the project demonstrates the methods and applications of automated approaches to experimentation in nanotechnology and education.