

SUMMER SCHOLARS PROJECTS

PROJECT CATEGORY: Drug delivery, biotechnology

STARTUP: Temprian Oncology

CONTACT:

SonBinh Nguyen

WEBSITE: <https://www.temprianonc.com/about>

EMAIL:

stn@northwestern.edu

PROJECT TITLE: Optimizing the synthesis of drug-loaded supercarriers for the treatment of metastatic melanoma

PROJECT DESCRIPTION

Temprian Oncology's mission is to develop, and through partnerships, commercialize novel nanoparticle-based therapies that can improve and extend the lives of patients with melanoma or metastatic melanoma. Our platform, based on technology invented in the Nguyen and Le Poole laboratories at Northwestern University, comprises a nanoscale-packaged prodrug that becomes active only where it is needed. The prodrug, which specifically targets melanoma cells through a novel mechanism, is protected inside nanoscale vesicles that will only release its content inside tumor cells after being "ingested" by such cells. In this manner, treatment of melanomas with our prodrug-loaded formulation can significantly increase efficacy, reduce side effects, and enhance the quality of life for patients.

We're seeking a highly motivated intern to join our team and assist with optimizing the synthesis of these novel nanoparticles for *in vitro* and *in vivo* testing.

JOB EXPECTATIONS:

The intern will be responsible for conducting experiments to optimize synthesis parameters for the drug-loaded nanoparticles including but not limited to nanoparticle size, drug-loading capacity, and nanoparticle concentration. The intern will work closely with our Entrepreneurial Scientist, the Director of Drug Delivery, and other team members to design and implement the experiments.

Principal Responsibilities:

- Conducting experiments to optimize nanoparticle synthesis.
- Carrying out analytical measurements on the nanoparticles such as UV-vis spectroscopy, NMR spectroscopy, and inductively coupled plasma optical emission spectroscopy (ICP-OES) to evaluate the effects of the parameter optimization.
- Keeping detailed records of protocols, experiments, results, and analysis.
- Collaborating with other team members to design and implement experiments.
- Presenting results and providing recommendations for future experiments.
- (Optional and depending on intern's interests) Participating in biological experiments.

DESIRED EXPERIENCE:

- Currently enrolled in an undergraduate or graduate program in chemistry, chemical engineering, biotechnology, bioengineering, or related field
- Laboratory experience equivalent to that obtained the laboratory sequence in sophomore organic chemistry.
- Knowledge of UV-vis spectroscopy and NMR spectroscopy and rudimentary knowledge in analytical measurements.
- Strong analytical and problem-solving skills.
- Strong written and verbal communications skills.
- Familiarity in data analysis (Excel and associated analysis/plotting of data in Excel). Knowledge of basic statistical methods is a plus.

TIME COMMITMENT:

This will be a full-time internship for 8 weeks with flexible dates over the summer. Hours may vary depending on experimentation schedule but is generally between normal business hours.

TRAINING MENTORING:

Initial Meeting

- The intern will meet with the Entrepreneurial Scientist, who will also serve as the project supervisor, and the Director of Drug Delivery to discuss the project goals and objectives, as well as the expectations for the internship.
- The intern will be provided with a project overview, including relevant background information, literature review, and experimental protocols.
- The intern will be given a tour of the lab facilities and introduced to the lab equipment and procedures.

Working Arrangements and Progress Meetings

- The project supervisor works closely with the intern and will provide daily guidance and feedback on the experimental design and data analysis.
- The intern will meet with the whole Temprian Oncology team on a weekly basis to discuss progress, any challenges encountered, and next steps.
- As Temprian Oncology is a closely-knit team, the intern has the freedom to ask questions and receive feedback on any challenges they may be facing.

Data Analysis and Interpretation

- The intern will be trained on data analysis and statistical methods beyond the use of Excel and its associated function and will receive guidance on the interpretation of results.
- The supervisor will provide feedback on data analysis and interpretation and will help the intern to identify any trends or patterns in the data.

Research Presentations and Reports

- The intern will be required to give brief weekly presentations (10-15 minutes) on their research progress and findings to the Temprian Oncology team and other relevant stakeholders.
- The whole Temprian Oncology team will provide feedback on the intern's presentation skills and will help the intern to improve their communication and presentation skills.
- The intern will be required to prepare a final report and give a final presentation on their research project.

Evaluation and Feedback. Informal feedback will be given regularly during the internship, as well as with two formalized sessions, one occurring halfway through the internship and a written evaluation occurring at the end of the internship, both containing a performance review of the intern's progress and work. The development of the intern will focus on improving problem solving skills in a professional context, solidifying verbal and written technical communication, and emphasizing collaborative engineering work.

- At the end of the internship, the supervisor will provide the intern with an evaluation and feedback on their performance.
- The intern will also have the opportunity to provide feedback on their mentoring experience and the internship program.