
Naval Surface Warfare Center - Indian Head Division (NSWC IHD), Indian Head, Maryland.

Energetic Materials Research

NSWC IHD is the Navy's premier facility for ordnance, energetics and explosive ordnance disposal (EOD) solutions. Internship projects center around the following: (1) lab work on propellants. (2) propellant testing (including field testing). (3) explosive manufacturing research. (4) robotics support & explosive detection equipment. (5) work on warhead designs (to include modeling and simulation studies). Midshipmen will be matched to projects based on their majors. Specific projects are listed on a separate document on the chemistry internship website.

<https://www.navsea.navy.mil/Home/Warfare-Centers/NSWC-Indian-Head/>

- Dates: Block 1, 2, or 3.
- Eligible for PTE credit: yes
- Qualifications: Rising 1/C or 2/C, chemistry, physics, computer science, and engineering majors.
- Funding: Lodging & meals provided at NSWC-Indian Head.
- Application: Submit online chemistry application. (The project can be entered on the application.)
- POC: Prof McClean mcclean@usna.edu

1. Characterization of Novel Energetic Materials

Required majors: Chemistry, Physics, Mechanical Engineering, Aerospace Engineering, General Engineering
Blocks: 1, 2, 3

Candidate will work on the characterization of novel energetic materials. This could include field testing and modeling including performance characteristics and analysis of signatures of the materials. These efforts could include organic and inorganic chemistry synthesis, modeling of the energetic materials, engineering efforts to develop testing and diagnostics and analytical process development.

2. Chemical, Biological and Radiological Protection Schemes

Required majors: Chemistry, Biology, Mechanical Engineering, General Engineering
Blocks: 1, 2, 3

Candidate will work on collective protection schemes against Chemical, Biological and Radiological Defense for ship and land based applications. The project could include modeling support and design support in these areas.

3. Polymer Binders

Required majors: Chemistry, all engineering
Blocks: 1, 2, 3

A research project has been funded to attach current neutralization tools to threats. A new polymer binder created at Johns Hopkins APL known as the Polymer Claw was selected as the attachment method. We need to evaluate our current tools and assess the best application methods and any increased capabilities. Tasks will include researching and familiarization of EOD energetic tools (explosive and neutralization devices) and their respective render safe procedures (RSPs) with a deliverable of a report detailing possible methods of integration with the polymer claw. The intern will be working with an underwater technologist.

4. Unique Pyrotechnical Devices

Required majors: Chemistry, Physics, all engineering
Blocks: 1, 2, 3

Naval Special Warfare Group 3 (NSWG-3) N8 requests intern support for Naval Surface Warfare Center (Indian Head) project being designed for NSWG-3. Project will involve assisting with the design of a unique pyrotechnical device. The intern will assist engineers on Electrical Engineering portion of the project and provide a report on the effects of material solution and analysis at the conclusion of the project.

5. Commercial Vessel Vulnerability to Air Blast

Required majors: Naval Architecture & Marine Engineering, Mechanical Engineering, General Engineering

Blocks: 1, 2, 3

Candidate will examine the effects of air blast on commercial maritime vessels using high fidelity modeling and simulation tools. Candidate will familiarize themselves with shock, impulse, air blast and other weapon effects and coupling these effects to the response of a target. Candidate will learn execution of high fidelity M&S, interfacing with local high performance computing assets with the intent of summarizing the vulnerability of a commercial maritime vessel.

6. Maritime Mine Neutralization Tools Evaluation

Required majors: Physics, Mechanical Engineering, Electrical Engineering, Aerospace Engineering, General Engineering, Computer Science

Blocks: 1, 2, 3

Candidate will aid in the evaluation of various systems to delivery mine neutralization tools. This could include field testing and modeling. M&S could include explosive effects and quenching due to pressure. Field testing could be kinetic effects of various munitions and performance of payload delivery tools. Depending on skill sets of candidate, evaluation and design of autonomous target recognition and search algorithms could be tasked.