

USNA Chemistry Internship Descriptions - Summer 2021

These descriptions are for traditional “chemistry” internships. For “medical” internships, see end of this document for information.

Applications must be submitted online, on the chemistry department internship webpage:

<https://www.usna.edu/ChemDept/ChemMajor/internships.php>

17 December 2020

1. ACS Nuclear & Radiochemistry Summer School.

San Jose State University, San Jose, California, and Brookhaven National Laboratory, Upton, New York

This is a competitive fellowship program that consists of lecture and laboratory components. It covers the fundamentals of nuclear theory, radiochemistry, nuclear instrumentation, radiological safety, and applications to related fields. Laboratory work will introduce the midshipman to state-of-the-art instrumentation and technology that are used routinely in basic and applied nuclear science. In addition, there are special symposia, guest lectures, and tours of nearby research centers. This internship helps prepare USNA graduates for service in the nuclear communities.

<https://www.nucl-accs.org/?p=1375>

- Dates: 14 June – 23 July 2021
 - Eligible for PTE credit: no (because it is a school)
 - Qualifications: Rising 1/C or 2/C, 2 years of chemistry, 1 year of physics, 1 year of calculus
 - Funding: Fully funded, but see POC
 - Application: (1) See website above. Deadline: 1 February 2021. (2) Also, submit online chemistry application.
- Note:** See the POC asap before applying.
- POC: Prof McClean mcclean@usna.edu

2. Armed Forces Radiobiology Research Institute (AFRRI), Bethesda, Maryland.

Radiobiology Research

The AFRRI mission is focused on radiation countermeasure research. i.e., research involving chemical, biological, radiological, nuclear, and high yield explosives. Midshipmen will work with military and federal civilian scientists on projects related to AFRRI's research portfolio in radiation biology, which includes biochemical and physiologic mechanisms, countermeasure development, radiation injury/dose assessment and prognostication, the effects of combined injury involving radiation, and delayed or late effects such as fibrosis and cancer. Specifics of each project will be determined after interaction between intern and mentor.

<https://www.usuhs.edu/afrrri>

- Dates: Block 1, 2, or 3
- Eligible for PTE credit: yes
- Qualifications: Rising 1/C, 2/C or 3/C. 1 year of chemistry and an interest in CBRNE. SC, SP, or ME majors.
- Funding: Reimbursement for daily commutes between USNA and AFRRI.
- Application: Submit online chemistry application.
- Other: Midn must reside at USNA and commute daily from USNA to AFRRI.
- POC: Prof McClean mcclean@usna.edu

3. The Baruch S. Blumberg Institute, Buck County, Pennsylvania.

Hep B Research

The Baruch S. Blumberg Institute is a leading nonprofit research organization dedicated to hepatitis B and liver cancer. A variety of research projects that center around hepatitis and virus research are available. Selected examples are (1) Early Detection of Disease. (2) Experimental Therapeutics. (3) Molecular Pathogenesis.

<http://blumberginstitute.org/>

- Dates: Block 1.
- Eligible for PTE credit: yes
- Qualifications: Rising 1/C or 2/C. Chemistry major and/or biology background.
- Funding: Fully funded.
- Application: Submit online chemistry application.
- POC: Prof McClean mcclean@usna.edu

4. The Bureau of Public Health Laboratories-Miami, Miami, Florida.

Infectious Organisms Research

The Bureau of Public Health Laboratories (BPHL) – Miami is one of 3 state reference laboratories in Florida. It provides testing to private sector laboratories for rare and unusual infectious organisms. BPHL-Miami also may confirm the findings of a private laboratory or perform additional high complexity tests for diseases of public health importance. BPHL also belongs to the National Laboratory Response Network for Bioterrorism (LRN-B). A midshipman participating in this internship will learn the role of public health departments in anticipating, detecting, and mitigating dangers to the health and safety of citizens. Because of its location in a major American city with a large international port and population, the participants will learn about the challenges involved in working with diverse and dynamic public health situations, including detection of bioterrorism agents.

<http://www.floridahealth.gov/programs-and-services/public-health-laboratories/>

- Dates: Block 1.
- Eligible for PTE credit: yes
- Qualifications: Rising 1/C, 2/C or 3/C, with an interest in public health. Completion of 1 semester of biology would be helpful.
- Funding: Fully funded.
- Application: Submit online chemistry application.
- POC: Prof O'Carroll ocarroll@usna.edu

5. **National Human Genome Research Institute (NHGRI), Bethesda, Maryland.**

Human Genome Research

Midshipmen will work with civilian scientists and clinicians on research projects that center around genetics and genomics. They will assist the scientists in carrying out experiments that are aimed at developing better approaches for detecting, diagnosing, and managing genetic disorders. Possible specific research areas are: a study of genetic changes that lead to the initiation and progression of cancer; the identification of genetic abnormalities responsible for human disease; the use of molecular genetics to identify disease-associated gene defects.

<http://www.genome.gov/10000218>

- Dates: Block 0 + 1 (or by arrangement for a minimum of 6 weeks).
- Eligible for PTE credit: yes
- Qualifications: Rising 1/C or 2/C.
- Funding: Typically, not funded.
- Application: (1) See website above; deadline: 1 March 2021. (2) Also, submit online chemistry application. **Note:** See the POC asap before applying.
- Other: Midn must reside at USNA and commute daily from USNA to AFRRRI.
- POC: Prof McClean mcclean@usna.edu

6. **Naval Research Laboratory (NRL), Washington, D.C. Synthetic Biology Research**

Participants in the synthetic biology internship at the Naval Research Lab in Washington, DC, will learn how to manipulate DNA in order to create living sensors to protect Navy divers. Interns will work side-by-side with NRL biologists to gain wet lab experience and basic skills in microbiology and molecular genetics to create bacterial cells that glow when exposed to toxic chemicals. By the end of the internship midshipmen will have experience designing PCR reactions, cloning DNA, and transforming bacterial cells with new DNA.

<https://www.nrl.navy.mil/cbmse/>

- Dates: Block 1, 2, or 3.
- Eligible for PTE credit: yes
- Qualifications: Rising 1/C, 2/C, or 3/C. Any major. Helpful if applicant has completed some biology or biochemistry courses.
- Funding: Reimbursement for daily commutes between USNA and NRL.
- Application: Submit online chemistry application.
- Other: Midn must reside at USNA and commute daily from USNA to AFRRRI.
- POC: CAPT Kennedy lkennedy@usna.edu

7. **Naval Research Laboratory (NRL), Washington, D.C. Virus Predictor - Sequence to Symptom**

Participants in the viral protein internship at the Naval Research Lab in Washington, DC, will learn how to clone and purify DNA and to express and purify proteins. Working closely with NRL researchers, interns will develop skills in molecular biology and biochemistry as they produce and purify target proteins containing short stretches of homologous host-pathogen protein sequences (SSHPS). These sequences have been identified as targets of viral proteases known to interrupt

host defense strategies, based on algorithms developed in the POC's laboratory. Proteins generated in the internship will support studies of biochemical pathways used by viruses to invade hosts. By the end of the internship, midshipmen will gain experience cloning DNA that contains a specific gene sequence, transforming bacterial cells with these new DNA constructs, and purifying target proteins encoded by the gene.

<https://www.nrl.navy.mil/cbmse/>

- Dates: 1, 2, or 3
- Eligible for PTE credit: yes
- Qualifications: Rising 1/C or 2/C who successfully completed or validated SC112 (or SC151), SC226, and SB251. Additional experience in biochemistry, biophysics, microbiology, virology, or immunology would be helpful.
- Funding: Reimbursement for daily commutes between USNA and NRL.
- Application: Submit online chemistry application.
- Other: Midn must reside at USNA and commute daily from USNA to AFRRRI.
- POC: Prof Schlessman schlessm@usna.edu

8. **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, and engineering majors.
- Funding: Lodging & meals provided at NSWC-Indian Head.
- Application: Submit online chemistry application.
- POC: Prof McClean mcclean@usna.edu

9. **Purdue University, West Lafayette, Indiana. Chemical Composition Analysis of Naval Tactical Fuels, and Engineering of Batteries, Solar Cells, Radar, and Turbine Systems**

This internship will involve hands-on laboratory work conducting experiments and simulations for a variety of renewable energy and electronics projects. The students will gain significant experience in a laboratory environment. It is expected that the student will conduct experiments/perform simulations with the aid of a mentor in the host laboratory's group (likely to be a graduate student or post-doctoral research scientist). At the conclusion of the internship, the student will present his or her work to the wider Purdue student body and faculty. Internship projects center around the chemistry of

batteries, thermal management of electronic systems, radar cooling designs, and turbine engineering. Specific projects are listed on a separate document on the chemistry internship website.

https://www.purdue.edu/?_ga=2.14380727.1863141713.1607565799-1166996221.1607565799

- Dates: Block 1
- Eligible for PTE credit: yes
- Qualifications: Rising 1/C or 2/C. Majors: chemistry, mechanical engineering, aerospace engineering, electrical engineering, or other related disciplines.
- Funding: Fully funded.
- Application: Submit online chemistry application. Specific project(s) must be entered on application.
- POC: Prof McClean mcclean@usna.edu

10. **Vanderbilt University, Nashville, Tennessee.**

Multianalyte Microphysiometry Methods

This internship will involve research with the Clifflab, which is developing new multianalyte microphysiometry methods with applications in cancer, diabetes, and

toxicology. This is done through electrochemical detectors for many metabolic analytes into the microfluidic chamber to give a complete dynamical picture of the live cell population. Work is always progressing, but recent projects included glucose, choline, lactate, IL6 protein and glutamine detection. The midshipman will work on either fabricating devices or testing detection capabilities. Ultimately, the research focuses on developing electrochemical sensors to detect the effects of biological toxins in cells. This could have applications as wide ranging as determining if a patient is experiencing sepsis or type of care needed after biological warfare attacks.

<http://www.vanderbilt.edu/chemistry/faculty/cliffel.php>

- Dates: Block 1 and Block 2 are available. Block 0 + 1 is preferred.
- Eligible for PTE credit: yes
- Qualifications: Rising 1/C or 2/C. Completion of SC261 & SC262. Completion of SC361 & SC364 is desired.
- Funding: Fully funded.
- Application: Submit online chemistry application.
- POC: CDR Durkin durkin@usna.edu

To Apply

Go to the chemistry department internship [webpage](#) and apply online.

Need Additional Information on an internship?

Contact the POC for that internship.

Chemistry Department Internship Webpage

<http://www.usna.edu/ChemDept/ChemMajor/internships.php>

Chemistry Department Internship POC:

Prof McClean (mcclean@usna.edu)

Medical Internships

The chemistry department also sponsors medical internships. Information can be found on the chemistry department internship website.

Other Internships with Chemistry Projects

A complete list of internships - some with chemistry projects - can be found on the USNA Internship website:

<https://intranet.usna.edu/AcResearch/USNA-Approved-Internships.php>