

CUA Vitreous State Laboratory Internship program

This program is intended for high school, college students undergraduate and graduate students interested in Hands-on training in science through summer internship.

A one-page resume can be sent to Dr. Isabelle Muller (isabellem@vsl.cua.edu) or Dr. Tanja Horn (HORN@vsl.cua.edu) through April 6, 2015. Internship subject will be offered with an effort to match the students' interests with the various subjects that are offered in our department, in the fields of particle physics (with collaboration at the Jefferson Lab), physics, chemistry and material science, working on radioactive waste glass formulation and testing, coal fly ash characterization and use in cementitious and geopolymer material, nano-spintronic, semiconductors, and biophysics, just to name a few!

High school students should be at least 16 years old, rising junior or senior.

A minimum of 5 weeks must be dedicated to this internship to be able to complete training, conduct research and present the fruit of their work in a final presentation. These take place in the auditorium and are attended by most of our Physics and VSL faculty, plus a few biology and chemistry professors.

Some of the students spent most of their summer break (10 to 12 weeks).

Some continue through collaboration with their high school (students at the Thomas Jefferson for Science and technology in Virginia may use this as an elective).

College students come from:

Carnegie Mellon (Physics)
Catholic University (Chemistry, Physics, Engineering)
Cornell University (Physics)
Eastern University (Environmental Science)
Georgetown (Physics)
Georgia Tech (Nuclear Engineering)
Mount Union College (Bio-Engineering)
Rensselaer Poly Tech, NY (Bio-Engineering)
University of Arizona (Optics)
University of Maryland (Physics, Biology)
Virginia Tech (Physics)
KMUTT (Thonburi, Thailand)
ESCOM (Compiegne, France)
ENSE³ (Grenoble, France)
Ecole des Mines (Nantes, France)
Hebrew University (Jerusalem, Israel)

High School Students from:

Bethesda/Chevy Chase HS (MD)
Paint Branch HS (MD)
Wootton HS Rockville, MD
Montgomery Blair HS, (MD)
McLean HS (VA)
St. Mary's Ryken HS (MD)
George C. Marshall HS (VA)
St. John's College HS (DC)
Trinity School, Falls Church (VA)
The Barrie School (MD)
Colnolie School of the Holy Child (MD)
Richard Montgomery HS (MD)
Montgomery Blair HS (MD)
Oakcrest HS, McLean (VA)
Trinity School, Falls Church (VA)
Wootton HS, Rockville (MD)
The Heights School, Potomac (MD)
Baton Rouge HS (LA)



Students about to present their results (August 2011), between Dr. Muller (left) and Dr. Pegg (right).

Some previous subjects of research:

- Study of the Laurent Glass Flutes (collaboration with the Musical Instrument Collections and research laboratory of the Library of Congress)
- Estimating the Dissolution Rate of LAW Glass Using Single-Pass Flow-Through Test (SPFT)
- X-Ray Diffraction Studies of Bismuth-Containing High Level Waste Glass Formulations
- Improving Technetium Retention in Hanford LAW Glass
- New Radioactive Glass Leach Test Method 1314 and Comparison to PCT, VHT, and TCLP
- The effect of Magnesium on the vitrified Low Activity Wastes
- Conductivity of Glasses with two Transition Metals
- Study of the influence of calcium on the strength of geopolymer cements
- Characterization of Reactivity of Fractionated Fly Ash by Leaching Test
- Synthesis of Coordination Complex Precursors Growth and Characterization of Ferromagnetic Nanowires
- Photovoltaic Research: semiconductor thin films, p-n diodes and solar cells
- Thermoelectricity in ceramic oxides
- Effect of Calcium in Fly Ash on Geopolymer Properties
- Biochemical Preparation for DNA Pulling Experiments
- Bone Tissue Engineering
- Radio-sensitizing Human Colorectal Cancer Cell
- Developing p-types material for radial p-n junction
- Off-gas Recycling in Vitrification Tests of Technetium containing Hanford LAW Wastes
- Tests with Low Activity Waste (LAW) and High-Level Waste (HLW) Glasses
- Feed Definition of Technetium Retention tests of LAW Hanford Waste Vitrification
- Growth of Germanium Nanowires using New Complex Coordination precursors
- The coupling effects of melter feed constituents under microwave radiation.
- Development of p-type Material at 725 K for Thermoelectric Applications
- Single Molecule Biological Physics
- Decomposition of Tetraphenylborate by means of Persulfate.
- Developing a MySQL Database and C# Client to Manage Mössbauer Spectroscopy Data
- Resistivity Measurements for Eutectic Composition of PbTe, CdTe
- Development of Three Dimensional Scaffolds for Tissue Engineering
- Genome-Wide Association Study (GWAS) Data Analysis
- Data acquisition techniques and development of testing equipment for the JLab Hall C 12 GeV kaon aerogel detector
- Simulations of light collection efficiency for the JLab Hall C 12 GeV kaon aerogel detector
- Conceptual design and component evaluation of particle detectors
- Electrical Conductivity Measurements on Glasses and Semi-conductor Micro-wires
- Characterization of Common Forms of Iron Contained in Hanford High Level Waste using Mossbauer Spectroscopy
- Ferrimagnetic Intermetallic Alloy
- Ternary Composite Polymers: Properties of Fresh and Cured Pastes
- A Tracking Algorithm to Analyze the Single Molecule Interactions between DNA and Histones
- Rheological properties of Hanford Low-Activity Waste Feeds at Different Solid Contents
- A study of Exchange Bias in Core/Shell Magnetic Nanostructures
- Thermoelectric Properties of Doped Barium Plumbate
- Determination of Aerogel Absorption Length
- Characterization of Large-Diameter Photomultiplier Tubes
- Determination of the spectrum of LEDs