

## Optimizing Latent Print Enhancement Techniques: A Forensic Science Independent Study by Tracy O'Brien, BS December '04

This past semester I had the unique opportunity to conduct an independent study with Michelle Peace, Doctoral Candidate, Department of Pathology & Instructor, Forensic Science and Chemistry, and Frank Curran, Investigator, Henrico County Police Department. As I walked into Michelle's office that cold January morning to discuss the independent study, I knew I was in for something big. She wanted me to assist Frank Curran in optimizing the latent print enhancement technique, silver physical developer, and compare it to the Ninhydrin technique commonly used by his department. Little did we know how important and all-consuming the physical developer project would turn out to be. Each experiment takes approximately two and a half hours to complete - one hour to prepare the solutions and another hour and a half for processing and deciphering the results.

Physical developer (PD), a reagent borrowed from photographic chemistry, is a silver-based aqueous reagent that reacts with the components of sebaceous sweat in latent prints to form a silver-gray deposit. These components include lipids, fats, oils and waxes which are present in fingerprint residue. Silver physical developer can be used to develop latent friction ridge detail on paper, latex gloves, adhesive tape, unfinished wood and other porous materials. Physical Developer usually follows the chemical processing with Ninhydrin. The purpose of this study was to determine whether processing with Physical Developer to visualize latent human friction skin impressions would improve the visual quality of impressions made visible by the Ninhydrin processing and to see if it resulted in more latent impressions being made visible than were done so by the Ninhydrin processing alone. The effects of time passage between the placement of human friction skin impressions and processing with Ninhydrin and Physical Developer were also noted.

For this experiment, four different types of paper were used: notebook paper, magazine paper, cardstock, and copy paper. Some of the ways in which the current physical developer was modified was by using reverse osmosis/deionized (RO/DI) water instead of standard deionized or tap water. Studies have shown that the amount and concentration of detergent and prewash as well as the level of silver nitrate could be reduced due to the higher purity of the water.

Because the modified formula we used was not producing the published results, we contacted the experts in fingerprint development, the United States Secret Service. They were very helpful in helping us figure out what wasn't working and offered their support in wonderful ways. In addition to the myriad of useful information the USSS sent me, they also considered my research "an aid to law enforcement" and supplied my chemicals so that I could continue my research well into the summer and subsequent fall semester. They also invited Michelle Peace, Frank Curran, and me to Washington D.C. to tour the Secret Service laboratory! That was a truly amazing experience and one I will never forget.

Thus far, we have achieved many results for these experiments, and several factors have played a role: (a) heating source temperature, (b) redox solution was not made according to published sequence, (c) possible diet of subject (salt



# Welcome

Dear  
Staff and Faculty,

Students,

A hearty welcome to those of you new to the Program and welcome back to those of you who are returning. I hope that you had fun and relaxing summers and are as excited about the start of a new school year as I am. As you will see, there have been several important additions since last year. First, please join me in welcoming Dr. Marilyn Miller to the faculty. Dr. Miller comes to us from the University of New Haven, after extensive crime laboratory experience. She will be teaching Crime Scene Recovery, Criminalistics and Forensic Chemistry courses for the Program. If you have not already met her, please drop in to introduce yourself. The second addition is the implementation of the Forensic Crime Scene Investigation concentration in the Criminal Justice major. Please talk with your advisor if you have any questions regarding this new curriculum.

I hope that the 2004-2005 school year is enjoyable and productive for all of you.

Best Wishes,  
Bill Eggleston  
Director



## Optimizing Latent Prints (continued)

intake), (d) compatibility of concentration of all solutions, and/or (e) processing too soon after latent prints were applied to test strips.

I am still conducting experiments and research for this project, and I hope to present my findings next spring and publish a paper on the outcome. This experience gave me great networking opportunities with an investigator from a local police department to agents in the United States Secret Service. Making solutions for this experiment also gave me confidence in my ability to work in a chemical laboratory! This independent study has made learning a

Greetings from Your Student Club  
President

Dear Forensic Science Student,

Welcome to VCU for the fall 2004 semester! I hope you were able to stop by the Forensic Science Student Club's "Meet and Greet" at the beginning of the semester. It's time again for our annual fall Career Workshop, scheduled for Tuesday, October 12th, from 3:30-5:00 p.m. at the University Student Commons, Commons Theater at 907 Floyd Avenue. Here is the lineup of speakers:

### **Shajuana Payne**

Assistant Director, University Career Center  
~Resources of the Career Center

### **Marilyn Miller**

Assistant Professor, Forensic Science Department  
~Career Opportunities (including non-Forensic Science jobs) and becoming an American Academy of Forensic Sciences member

### **Tracey Dawson Cruz**

Assistant Professor, Forensic Science and Biology  
~ Resume formats that best communicate the applicants' experiences

### **Mason Byrd**

Instructor, Forensic Science and Criminal Justice  
~Pertinent and appropriate interview skills and conduct

### **Michelle Peace**

Doctoral Candidate, Department of Pathology, & Instructor, Forensic Science and Chemistry  
~ Internships and independent studies: their utility, the students' options, how the process works to get one, and expectations of the participating students.

I look forward to seeing you on October 12th and to your participation in other fall club activities!

Sincerely,

Pamela Jill Grizzard  
FSSC President

Semester in the Sciences at the University of the West of England by Jennifer Ludovici, Director of Education Abroad, VCU's Office of International Education



VCU's Office of International Education announces the only university wide exchange specifically designed for students in Chemistry, Biology, **and Forensic Science** at the University of West England. Located on the southwestern coast of England, Bristol is a city steeped in history, yet still has a vibrant modern social scene that includes music, shopping, and the arts.

The university system in England is quite different from that of the United States. As a student at UWE you will have the freedom to plan your own academic life. There will be less emphasis on formal teaching and supervision than you have been used to, and your time management skills will become very important.

UWE Bristol is a renowned institution with innovative research centers where you are sure to get the experience of a life time!

Students with a minimum cumulative grade-point average of 3.0 and who have certain course prerequisites are eligible to apply. Stop by the Office of International Education for more information and to see a VCU/UWE course equivalency sheet. Your program has evaluated these courses and determined equivalencies. We are located at 916 W. Franklin Street on the 2nd floor.

## Internships and Externships

**FRSC 493, Forensic Science Internships** are available for Forensic Science seniors who have completed 27 credits in the core program and have a 2.75 cumulative grade-point average. Opportunities include internships with the Virginia Division of Forensic Science, the Institute for Drug and Alcohol Studies, the Biochemistry and Biophysics labs at VCU/MCV and others.

Interested and qualified students should review the internship guidelines and the application on the Forensic Science web page at <http://www.has.vcu.edu/forensics/intern> and then visit the Forensic Science Office at 1000 W. Franklin Street to review opportunities listed in the Internship notebook. After indicating the top two choices and submitting the application essay, students then schedule an appointment to meet with Bill Eggleston, Director. After that meeting, the remainder of the application is due by the deadline, October 15, 2004.

If you are interested in a location not on the list, bring Dr. Eggleston the contact information of the sponsor you are interested in and let the Forensic Science Program make the arrangements.

The **FBI** sponsors a prestigious summer internship - for more information go to <http://www.fbi.gov/employment/honors.htm>.

See Also the **Federal Law Enforcement Training Center's College Intern Program** (FLETC) at [http://www.fletc.gov/tmc/college\\_intern\\_program.htm](http://www.fletc.gov/tmc/college_intern_program.htm) and the **Department of the Navy's Naval Criminal Investigative Service' Student Internship Program** at [www.ncis.navy.mil](http://www.ncis.navy.mil).

Other ways to gain exposure to the world of forensic science are through externships. **VCU Alumni Externship Program** (non-credit) provides opportunities for students to explore careers of interest by "shadowing" alumni on the job. This program is offered during the winter break in January and spring break in March. For more information, contact the Office of Alumni Affairs early October at 924 W. Franklin Street; 828-2586.



VCU Forensic Science Student Club's "Meet and Greet", September 2004

### Important Dates

*October 12* - Forensic Science Student Club Career Workshop, 3:30-5 p.m., University Student Commons, Commons Theater, 907 Floyd Avenue.

*October 15* - Deadline to apply for fall internship

*October 21-22* - Reading Days. No classes.

*October 25-29* - Advising for spring semester

*November 5* - Last day to withdraw with a mark of "W." Talk with financial aid before withdrawing from a class.

*November 25-28* - Thanksgiving Holiday

*December 11* - Last Day of Classes



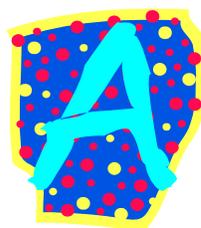
*December 11* - December Commencement

*December 13-18* Final Exams

**Need Help?** Free tutoring for math and science classes is available Monday through Friday at the Learning Center at the Education Annex, 109 N. Harrison street. Just walk in M-R at 11 a.m.-1 p.m.; 1-3 p.m.; 3-5 p.m.; 5-8 p.m. Friday hours are the same except there are no evening hours. Includes tutoring for MATH 141, 151; BIOL 151-52; BIOL 218; CHEM 100; 101-02; CHEM 301-302.

Academic Success Program Workshops offer help on note-taking, test-taking, stress management, and other study strategies. Visit <http://www.students.vcu.edu/counsel/asp.html>.

VCU Forensic Science welcomes **Marilyn T. Miller**, Assistant Professor. Miller is a graduate of Florida Southern College with a bachelor's degree in Chemistry. She earned a master's degree in Forensic chemistry from the University of Pittsburgh and EdD from Johnson & Wales University in Post-Secondary Educational Leadership. A full member of the Criminalistics section of the American Academy of Forensic Science, the Southern Association of Forensic Scientists, and the American Chemical Society, Miller teaches a wide variety of forensic science and crime scene investigation classes to both forensic science and criminal justice majors at the undergraduate and graduate levels. She is a faculty member of the Henry Lee Institute of Forensic Science and the National Crime Scene Training Center. She has presented and taught as part of hundreds of forensic seminars across the United States and has vast experience as a forensic scientist. In addition to expertise in forensic science, other areas of emphasis are scientific crime scene investigation and reconstruction and bloodstain pattern analysis.



**Advance Registration is for Advance Registration and Advising. Plan to see your Forensic Science advisor the week of **October 25th-29th.****

Registration dates are as follows:

- Honors: October 25th
- Graduate students: November 1st
- Seniors: November 3rd
- Juniors: November 8th
- Sophomores: November 15th
- Freshmen: November 22nd