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**FROM THE DESK OF DR. JOHN ALLISON
Professor and Director of Forensic Chemistry, TCNJ**

Welcome to the September 2007 issue of the newsletter of the Forensic Chemistry Program at The College of New Jersey. With each newsletter, we try to provide information that may be of interest to a cross-section of readers, from high school students through forensic professionals. We get many questions about internship opportunities, and part of this newsletter is devoted to this topic, since opportunities (paid and unpaid) are available for students and teachers. Also, to give readers some idea of internship options, we have asked TCNJ students who were involved in Forensic- related internships in the Summer of 2007 to each provide a few comments on their experiences. Obviously, we are very proud of our students, and the hard work they do to find important educational experiences. Hopefully, these examples may give readers interested in internships some ideas and targets for next summer. Clearly, as a subject to study and a career to pursue, Forensic Science is still "hot!" Our academic year has just begun at TCNJ, and we look forward to another exciting fall semester. We hope you enjoy reading this issue of our newsletter.

NEWS ITEM

Mayor Bloomberg And Chief Medical Examiner Hirsch Cut Ribbon At Largest Government DNA Laboratory In The Country

On July 18, 2007, Mayor Michael R. Bloomberg and Chief Medical Examiner Dr. Charles Hirsch presided over the grand opening of the new state-of-art Forensic Biology Laboratory of the Office of the Chief Medical Examiner, which is the largest government DNA laboratory in the country. Construction of the lab began under Mayor Giuliani in November 2001 and already performs more DNA testing than any other public laboratory in the nation, including the FBI DNA laboratory. Among its many features, the lab includes facilities to reconstruct crimes and analyze bone and other biological materials that do not produce standard DNA samples.

In regards to the new facility, Mayor Bloomberg stated "The new DNA Lab will now give us the capability to analyze DNA not just from murders and sexual assaults, but from a broad range of criminal investigations including property thefts." He went on to say "the facility isn't only going to work on identifying the guilty; it will also be used to clear the innocent."



Police Commissioner Raymond W. Kelly said “Perhaps more than any other city agency, the Office of Chief Medical Examiner is the Police Department’s partner in crime-solving. This new facility will only help to advance the speed and success of our investigations. The use of DNA in bringing criminals to justice has evolved into a critical tool for police — one that has been popularized on television series watched by millions [sic]. But the fact is, evidence collection and analysis is difficult, painstaking, often tedious work. It demands highly trained experts and the best equipment. We will see both on display in this new facility.”

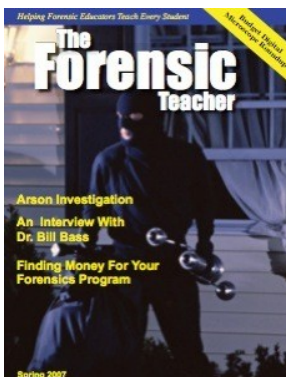
The Forensic Biology Lab has been recognized by the FBI as contributing the highest number of searchable DNA profiles to the national DNA database. Current DNA testing is limited to homicide cases, sexual assaults and other selected cases. The continued growth of DNA testing as an investigative forensic tool came along with the ability to test evidence from an increasing number of crime types. The new lab will enable investigators to perform extensive DNA analysis and to apply enhanced techniques to solving these types of cases. The addition of assault cases and property crimes as well as other crime types is projected to increase the forensic biology case load from 3,000 a year to approximately 25,000 per year.

The \$290 million, 340,000 square foot facility contains 75,000 square feet of laboratory space and has a fully equipped training laboratory and classroom along with research and development laboratories. The building, which City employees began to occupy in February, houses members of the following departments: Forensic Biology, Evidence and Security, Legal, Administration and Information Technology.

For more information, see news and press releases at www.nyc.gov for July 18, 2007.

FOR TEACHERS

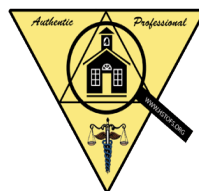
If you are not aware, there is a magazine, The Forensic Teacher available at no charge. Request your free subscription at www.theforensicteacher.com



You may want to investigate The National Association of High School Teachers of Forensic Science. You can visit them at www.hstofs.org

The source for teachers of Forensic Science to obtain and share authentic and professional information, techniques, and materials to aid in the teaching of Forensic Science on the high school level.

ASK AN EXPERT - FORUMS - DIGITAL GOODS
WEB LINKS - NEWS - WORKSHOPS



Also check out these “Hot Websites”

<http://www.nvps.net/npsnhs/Curriculum%20Maps/Teacher%20Resources.htm>

-An excellent site with lots of resources for those teaching forensics.

<http://www.le.ac.uk/pa/teach/va/titlpag1.html>

-A site devoted to virtual autopsies. Excellent for an introduction to pathology.

BOOK REVIEW



The creators of the New York Times Best Selling “Body Farm” series are at it again with their latest work of non fiction: Flesh and Bone. The story catches up with forensic anthropologist Dr. Bill Brocton who is investigating a crime scene at a Tennessee State Park. Along with Medical Examiner Dr. Jess Carter, the duo try to piece together an approximate timeline leading up to the death of a young man.

Many in the field are familiar with Jefferson Bass and the “Body Farm” novels, but few actually know anything about the man, or rather men, themselves. “Jefferson Bass” is the pseudonym of the real life team of Dr. Bill Bass and Jon Jefferson.

Dr. Bass is a world renowned forensic anthropologist who founded the University of Tennessee’s research facility — The Body Farm. Bass is most famous for his research on human osteology and human decomposition.

Jon Jefferson is a seasoned journalist and documentary film maker. His works have been published in *Newsweek*, *The New York Times*, *USA Today*, and *Popular Science*. Jefferson is also the director of the critical acclaimed National Geographic documentaries about the Body Farm.

For more information on the team of Jefferson Bass, the Body Farm novels, as well as other examples of their non-fiction work, visit their website at: <http://jeffersonbass.com/index.php>.

INTERNSHIP OPPORTUNITIES

New York State Police Intern Program

Target Group:

Graduate and undergraduate students who are interested in an internship with a New York State Troop or at a Division Headquarters

Internship Summary:

120-150 hours during the Spring and Fall Semesters

Undergraduate students learn about the organization, staffing, mission, activities, programs, and services of the Division of New York State Police.

Graduate students conduct research on issues of importance to the host section, the Division of State Police, or to the Criminal Justice System in general. A graduate internship is preceded by a 20-hour orientation to the NYSP.

To Apply:

Visit: <http://www.troopers.state.ny.us/Employment/Internships>

 **Office of Chief Medical Examiner****Target Group:**

Undergraduate and Graduate students interested in working with the Office of the Chief Medical Examiner

Internship Summary:

The Office of the Chief Medical Examiner investigates cases of persons who die, within a given jurisdiction, from criminal violence.

To Apply:

Contact the Medical Examiner's office in your area to determine whether they work with interns.

For example:

Contact information for the New York City Chief Medical Examiner is available at:

<http://www.nyc.gov/html/ocme/html/dirmedex.html>

In Philadelphia: *<http://www.phila.gov/health/units/meo/index.html>*

 **FBI Visiting Scientist Program****Target Group:**

Visiting Scientists include university faculty, postdoctoral fellows, recent graduates and both graduate and undergraduate students.

Internship Summary:

The Visiting Scientists Program provides a valuable connection between the FBI Laboratory and academia. Participants are afforded a unique work experience to enhance their professional development and increase their research contributions in their chosen field of study.

To Apply:

Visit: *<http://www.fbijobs.gov/242.asp>*.

 **FBI National Center For The Analysis Of Violent Crime Volunteer Internship Program****Target Group:**

Exceptional students from undergraduate, graduate, or law school programs.

Internship Summary

This 14 week program allows interns to view the FBI from the inside and to contribute significantly to research into violent crime and terrorism.

To Apply

Visit: *<http://www.fbijobs.gov/232.asp>*

 **The Federal Law Enforcement Training Center (FLETC) College Intern Program****Target Group:**

Students majoring or obtaining advanced degrees in Criminal Justice, Criminal Justice Administration, Forensic Sciences, Psychology, or Computer Forensics as well as students pursuing Juris Doctorate degrees.

Internship Summary:

Interns participate within the Federal Law Enforcement training environment. Each intern is assigned to a mentor in one of the FLETC training divisions. Sessions will expose interns to both basic and advanced law enforcement training programs. Furthermore, students will spend time working on meaningful law enforcement training-related research and writing projects.

To Apply:

<http://fletc.gov/student-information/college-intern-program>

 **CIA Undergraduate Scholarship Program Target Group:**

High school seniors planning to enroll in a 4-5 year undergraduate program or a college sophomore enrolled in a 4-5 year college program.

Internship Summary:

Scholars will be given meaningful work within their major. The position will develop new, or enhance current skills through work on relevant projects.

Those selected will be given an annual salary, and up to \$18,000 per year tuition reimbursement.

To Apply:

Visit *<https://www.cia.gov/careers/jobs/view-all-jobs/undergraduate-scholarship-program.html>*

Applications must be received by Nov. 15



REPORTS FROM SUMMER INTERNS 2007

I hope you enjoy learning about how a few TCNJ students spent their summers. Ada, Lori, Ryan and Alison all participated in a New Jersey State Police Internship program designed exclusively for TCNJ students. Lori and Alison were each returning for the second summers. All of the students listed below are TCNJ Chemistry majors except for Lori, who is majoring in Health and Exercise Science. Ryan is an experienced intern, having spent last summer at Merck and part of his Spring 2007 semester as an intern at the Ocean Country Forensic Laboratory in Tom's River, NJ. We were very excited to learn that Brittany successfully negotiated an internship with a coroners office in Pennsylvania. Trevor and Shawn worked in my lab at TCNJ. Kerri negotiated an impressive FBI internship, and recently learned that she will be returning there when she graduates. We were also excited to have Steve as our first TCNJ intern working in Union County. We are proud of them all.

- J. Allison.

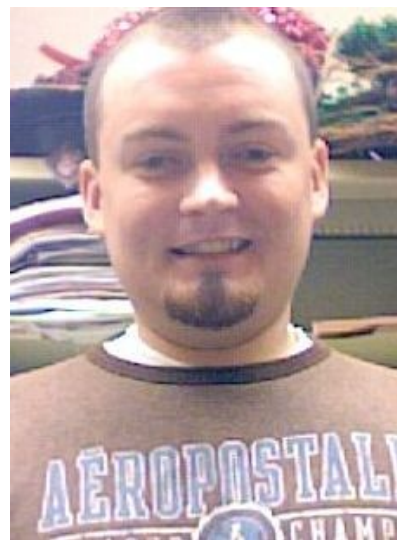


Brittany Speer

From May 2007 to August 2007, I interned with the Lycoming County Coroner (Charles E. Kiessling) and Deputy Coroner (Chief R. Mark Lusk). I was on call 24/7 during the 9 week internship for all unattended deaths. I would report to the scene and collaborate with the Pennsylvania State Police Troop F (specifically the Forensics Unit) for investigations (sketching the scene, marking where blood, weapons, or other significant items were discovered). It was then my duty to assist the coroner in removing the body to the Williamsport Hospital Morgue for testing of the bodily fluids (depending on the circumstances of the death, testing could range from just taking blood samples to running multiple toxicology screens). Every MVA victim (motor vehicle fatality), for example, would have to be tested for a blood alcohol level for which I would take blood, preferably from the femoral artery if not cardiac or sub-clavicle sample. When an autopsy was ordered, I would assist the forensic pathologist and learn the keys to determine COD (cause of death). I have seen the aftermath of fatal fires, decomposition, MVA, suicides, homicides, natural deaths, and much more. The experience and knowledge I gained during this internship was immense. Working in such close quarters with experts such as PA State Police Corporals, accident re-constructionists, coroners, and renowned forensic pathologists gave me an insight into the field of forensics that I would never have had otherwise.

Ryan Oesterle

During my internship this summer I worked with the Drug Unit at the NJSP Forensic Lab in Hamilton. I got the opportunity to see first-hand what exactly the members of the Drug Unit do on a day-to-day basis to examine casework. I was able to observe them working on actual cases and see how they examine and identify the possible illicit substances. I was also able to conduct some research in their laboratory utilizing GC/MS instruments for analysis of certain drug compounds. These drugs produce mass spectra dominated by a single peak which makes their definitive identification by this technique troublesome. The lengthy and costly technique of chemical derivatization is the normal method of analysis to bypass these rather non-informative spectra. I was investigating a new technique for the interpretation of this data without the need for derivatization. I was able to gain a wealth of experience and knowledge during my 12 weeks there and was able to work with a great group of individuals, too. I think the opportunity was valuable and I would recommend it to anyone who is interested in the field of Forensic Chemistry.

**Ada Li**

This summer I participated in the internship program at the NJSP Office of Forensic Sciences. As an intern in the Criminalistics unit, I worked on a project, which focused on the analysis and comparison of automotive clear coats. Clear coats are normally not analyzed to provide significant data for cases, but they have been shown to contain information that can have some evidentiary value. The purpose of the project was to determine if the use of ultraviolet microspectrophotometry (UV-MSP) could provide discrimination between various clear coats if the use of FTIR could not do so. I worked on this project throughout the internship and gave a presentation on it at the end of the summer. Other than working on the project, I watched the scientists at the lab work on their cases. I had a good experience interning at the NJSP Laboratory, and I came out learning a lot.



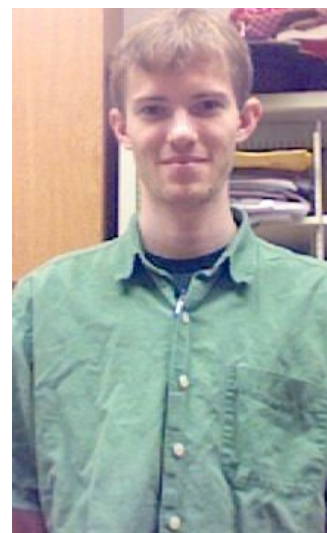
Lori Adriance

I interned with the New Jersey State Police Office of Forensic Sciences in the DNA laboratory. Since this was my second summer interning with the NJSP, I had already received extensive training in DNA analysis, including extraction, quantitation, amplification, and detection. As a result, I was able to implement my previous DNA analysis training to conduct a research study this summer. The research project, "NJSP Mixture Guidelines Validation Using Identifiler", examined the validity of the NJSP 70% peak height ratio guideline currently used to interpret evidentiary casework samples. The Identifiler Amplification Kit was implemented in a series of six amplification steps targeting 1ng, 0.75ng, 0.5ng, 0.25ng, 0.1ng, and 0.05ng of DNA, respectively. Allele ratios at each heterozygous locus were calculated for each sample and then averaged. The average peak -height ratio minus three standard deviations, to ensure

99% confidence, was below the 70% guideline for the 0.5ng target of DNA. Therefore, when casework samples target 0.5ng of DNA or less, forensic scientists cannot be confident that the two alleles present belong to the same individual. Overall, my experience at the DNA laboratory was extremely positive. I learned so much about the applicability of biology and genetics concepts to forensic casework, and thoroughly enjoyed working with the forensic scientists at the NJSP Office of Forensic Sciences.

Trevor Cornell

This summer I had the opportunity to conduct research with Dr. Allison at TCNJ in the area of questioned document analysis. The main focus of our efforts was on developing a method to analyze pigmented printer inks by way of mass spectrometry. These inks are different from traditional dye based inks, and are frequently advertised as being able to produce long-lasting, "archival quality" prints. Since these inks are chemically different from those that are dye- based, being able to develop reliable methods for identification of unknown samples is very important, given their growing popularity. The experience of conducting research is somewhat different from what I had originally expected. There were days when we'd sit and puzzle out spectra, discuss theories about what we were seeing (or not seeing), and others when we'd measure samples non-stop. It's a very rewarding experience, especially when something clicks, and things start falling into place. It's an experience that I would gladly repeat, and I would encourage anyone else who has the chance to try it out as well.





Shawn Donnelly

During the summer of 2007, I studied the various components of Ink Jet inks with Trevor Cornell under the supervision of Dr. John Allison. The research centered around, though was not limited to, Time-of-Flight Laser Desorption Mass Spectrometry. Using this technique we intend to show that any questioned document made with today's increasingly complex ink jet printers can be analyzed for particular combinations of components with spectroscopic signatures belonging to a specific manufacturer's blend of ink. There are many other tools at our disposal. Documents were also examined microscopically for dot assignment along with any trends that may belong to an individual printer or manufacturer. As the research progressed, our group slowly started to arrive at the conclusion that the

initial assumption that the ink inside of ink jet printers would be similar to that of ink found in pens and other writing utensils was not actually the case. What our research group did find was that as the number of samples from the different printers increased, so did the number of components along with the complexity of the project. Similar to LD MS, Matrix Assisted Laser Desorption Ionization (MALDI) mass spectrometry was also used to detect multiply-charged dyes found in some of the ink cartridges. Currently the research is evaluating alternative MALDI approaches along with TLC examination of the various dyes belonging to the number of printers we are testing.

Participating in the Summer Undergraduate Research Program at TCNJ was a really an invaluable experience in that it has shown me two fields of chemistry that I have found to be not only immensely interesting, but are also viable possibilities as career paths.

Alison McQuilken

This summer at the NJSP Forensic Lab, I continued my research on current methods of glass analysis in forensic examinations used at the state police. I used the glass samples obtained last summer and analyzed their elemental components, using the LA-ICP-MS, to determine any elemental variation within a single pane of glass. I also compared different samples with similar refractive indices to determine if their compositions were similar. Overall, it was great working with the scientists at the lab; they were very helpful and taught me a great deal about what they do every day. It was also interesting working with such a sensitive instrument that could detect elements at such low concentrations in the glass. It was certainly a valuable learning experience this summer at the forensic lab.





Kerri Moloughney

This summer, I worked as a Visiting Scientist in the FBI Laboratory's Counterterrorism and Forensic Science Research Unit (CFSRU), in Quantico, Virginia. The ORISE Visiting Scientist Program brings undergraduate students, graduate students, post-docs and PhDs together in a setting outside academia to do research with FBI staff scientists. Under the direction of my mentor, Dr. Diane Williams, I was able to work on multiple research projects that both interested and challenged me. I was given the opportunity to work with many different instruments, including a thermal camera, multiple FTIRs with microscope attachments, a

microspectrophotometer, and polarized light microscopes. I also designed two research posters. One of the posters was based on research I had been involved in, and I was given the chance to present it at the NIJ Trace Evidence Symposium in August with Dr. Williams and a fellow Visiting Scientist. The other poster was presented by Dr. Williams at the ACS National Conference. The experience for me was above and beyond what I had expected to be able to learn and do in just one summer. It was a wonderful opportunity for me to both meet and learn from chemists in the field of Forensic Science.

Steve Wisniewski

This past summer I interned at the Union County Prosecutor's Forensic Laboratory in Westfield, New Jersey. While there, I compiled the drug vault inventory, which contains all cases from 1983. This inventory has to be completed once a year. I also created a new chemical inventory that will be posted at exits as part of the Right to Know NJ State guidelines. Aside from this work, I also completed work in the lab. I learned the three tests that Union County uses to declare Controlled Dangerous Substance [CDS] positive. These tests are crystal, color, and GC/MS for Heroin/Cocaine and microscopic, color, and GC/MS for marijuana. I also learned the extraction techniques for obtaining IRs for MDMA/MDA/etc. The Prosecutor's Office held several intern luncheon meetings throughout the summer including Fire Arm Training Simulator [FATS] and a polygraph expert. During one week there, I viewed a homicide trial from start to finish in Elizabeth at the County courthouse and saw testimony from many people, including a medical examiner. Overall, it was a great experience.

