



CRIMEScene

Newsletter of the Northwest Association of Forensic Scientists

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Happy Birthday to the Colt 1911 Pistol!

After a rigorous endurance test involving submersion in sand and mud, rusting in acid, and the firing of 6000 rounds, the Colt 1911 test pistol did not experience a single instance of malfunction or breakage. Due to its stellar field testing performance, the 1911 was formally adopted by the US Army on March 29, 1911.

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PRESIDENT'S MESSAGE

ROCKLAN McDOWELL

I love Spring. It is truly a great time of year. The land begins to shake off the end of winter drab and offers new colors, new growth, and the promise of better weather around the bend.

This Spring brings new beginnings for the Association as well. The proposed Code of Ethics has been posted on the website and you will find it in this issue. I urge each of you to review it. These are the standards of professional conduct we are proposing for the members of the Northwest Association of Forensic Scientists. Let me take a second to nudge you in the direction of attending the meeting this fall, because your vote regarding the Code is counted only if you are present at this Fall's business meeting.

The Ethics Committee is continuing their work and will be proposing an enforcement policy to go along with the Code of Ethics. We plan on having it ready for the Fall meeting as well. Both of these additions to our policies will be important as we progress as an Association.

Another big change is in how the newsletter is coming to you! I want to thank Kori Barnum and Jeff Borngasser and everyone who made it happen. This is a big step for the association, a positive one, which has the added benefit of decreasing our dependence on paper products! Please update your e-mail address with Jeff via the website membership roster. It's the best way to keep the information from the organization coming to you!

As the preparation for Salt Lake City 2007 progresses, it is time to begin thinking about paper presentations and opportunities to discuss topics with your colleagues. You are welcome to contact **meeting organizer Jay Henry** (jhenry@utah.gov) or me about presenting. There are some awesome workshops and activities planned for the week of November 5-9. See you there!

That deals with most of what is on the "Desk of the President," so I give in to the sunshine and the pursuit of an improved USGA handicap! I hope the warmer days are finding you all happy and healthy.

Rocklan McDowell

EDITOR'S MESSAGE

KORI BARNUM

There's a lot of important and timely information in this edition of *CrimeScene*, particularly the proposed Code of Ethics and a consideration of how Daubert Hearings have impacted latent prints and firearms in the Oregon State Police. These topics highlight the ever increasing need for each of us to be vigilant about our professionalism within the various communities in which we each participate. Please, take this opportunity to voice your opinions regarding the Code of Ethics, courtroom testimony, or any other subject you feel is salient to forensics in the Northwest and beyond - it's as simple as sending me an e-mail. This newsletter is your tool to welcome dialogue with your peers, debate issues, and support each other.

Special thanks go out to grammar goddess and all around rock star Kris Gates, who has generously and patiently edited each *CrimeScene* issue to correct my grammatical gaffes and alleviate my writing worries. She is truly still in the salad days of her work as a media consultant. Kris, I bow to your greatness!

Kori Barnum

Proposed Code of Ethics ~ Northwest Association of Forensic Scientists

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Code of Ethics of the Northwest Association of Forensic Scientists

Preamble

This Code is intended as a guide to the ethical conduct of individual workers in the field of forensic science. It is not to be construed that these principles are immutable laws or that they are all-inclusive. Instead, they represent general standards that each worker should strive to meet. At the same time, the fundamentals set forth in this Code are to be regarded as defining the expected conduct of members of the profession and of this Association. The failure to meet or maintain these standards will justifiably cast doubt upon an individual's fitness for this type of work. Serious or repeated infractions of these principles may be regarded as inconsistent with membership in this Association. Forensic Science as a professional occupation is concerned with the scientific analysis and examination of physical evidence, its interpretation, and its presentation in court. It involves the application of principles, techniques and methods of the physical sciences, and has as its primary objective a determination of physical facts which may be significant in legal cases.

It is the duty of any person practicing the profession of forensic science to serve the interests of justice to the best of their ability at all times. In fulfilling this duty, they will use all scientific means at their command to ascertain the significant physical facts relevant to the matters under investigation. Having made factual determinations, the forensic scientist must then interpret and evaluate the findings. In this they will be guided by experience and knowledge which, coupled with a serious consideration of the analytical findings and the application of sound judgment, may enable them to arrive at opinions and conclusions pertaining to the matters under study. These findings of fact and the conclusions and opinions should then be reported, with all the accuracy and skill of which the scientist is capable, to the end that all may fully understand and be able to place the findings in their proper context.

In carrying out these functions, the forensic scientist will be guided by those practices and procedures which are generally recognized within the profession to be consistent with a high level of professional ethics. The motives, methods, and actions of the forensic scientist shall at all times be above reproach, in good taste and consistent with proper professional conduct.

I. ETHICS RELATING TO THE SCIENTIFIC METHOD:

- A. The forensic scientist has a truly scientific spirit and should be inquiring, progressive, logical and unbiased.
- B. The true scientist will make adequate examination of all materials, applying those tests essential to proof. They will not, merely for the sake of bolstering their conclusions, utilize unwarranted and superfluous tests in an attempt to give apparent greater weight to the results.
- C. The modern scientific mind is an open one, incompatible with secrecy of method. Scientific analyses will not be conducted by "secret process", nor will conclusions in case work be based upon such tests and experiments as will not be revealed to the profession.
- D. A proper scientific method demands reliability of validity in the materials analyzed. Conclusions will not be drawn from materials which themselves appear unrepresentative, atypical or unreliable.
- E. A truly scientific method requires that no generally discredited or unreliable procedure be utilized in analysis.
- F. The progressive worker will keep abreast of new developments in scientific methods and in all cases view them with an open mind. This is not to say that they need not be critical of untried or unproven methods, but they will recognize superior methods when they are introduced.

II. ETHICS RELATING TO OPINIONS AND CONCLUSIONS:

- A. Valid conclusions call for the application of proven methods. Where it is practical to do so, the competent forensic scientist will apply such methods throughout. This does not demand the application of “standard test procedures”, but, where practical, use should be made of those methods developed and recognized by this or other professional societies.
- B. Tests are designed to disclose facts and all interpretations shall be consistent with that purpose and will not be knowingly distorted.
- C. Where appropriate to the correct interpretation of a test, experimental controls shall be made for verification.
- D. Where possible, the conclusions reached as a result of analytical tests are properly verified by re-testing or the application of additional techniques.
- E. Where test results are inconclusive or indefinite, any conclusions drawn shall be fully explained.
- F. The scientific mind is unbiased and refuses to be swayed by evidence or matters outside the specific materials under consideration. It is immune to suggestion, pressures and coercions inconsistent with the evidence at hand, being interested only in ascertaining facts.
- G. The forensic scientist will be alert to recognize the significance of a test result as it may relate to the investigative aspects of a case. In this respect they will, however, scrupulously avoid confusing scientific fact with investigative theory in their interpretations.
- H. Scientific method demands that the individual be aware of their own limitations and refuse to extend themselves beyond them. It is both proper and advisable that the scientific worker seek knowledge of new techniques and procedures; they will not, however, be hasty to apply such knowledge before they have had adequate training and experience.
- I. Where test results are capable of being interpreted to the advantage of either side of a case, the forensic scientist will not choose that interpretation favoring the side by which they are employed merely as a means to justify their employment.
- J. It is both wise and proper that the forensic scientist be aware of the various possible implications of their opinions and conclusions and be prepared to weigh them, if called upon to do so. In any such case, however, they will clearly distinguish between that which may be regarded a scientifically demonstrated fact and that which is speculative.

III. ETHICAL ASPECTS OF COURT PRESENTATION:

- A. The expert witness is one who has substantially greater knowledge of a given subject or science than the average person. An expert opinion is properly defined as “the formal opinion of an expert.” Ordinary opinion consists of one’s thoughts or beliefs on matters, generally unsupported by detailed analysis of the subject under consideration. Expert opinion is also defined as the considered opinion of an expert, or a formal judgment. It is to be understood that an “expert opinion” is an opinion derived only from a formal consideration of a subject within the expert’s knowledge and experience.
- B. The ethical expert does not take advantage of the privilege to express opinions by offering opinions on matters within their field of qualification which they have not given formal consideration.
- C. Regardless of legal definitions, the forensic scientist will realize that there are degrees of certainty represented under the single term of “expert opinion.” They will not take advantage of the general privilege to assign greater significance to an interpretation than is justified by the available data.
- D. Where circumstances indicate it to be proper, the expert will not hesitate to indicate that while they have an opinion, derived of study, and judgment within their field, the opinion may lack the certainty of other opinions they might offer. By this or other means, they take care to leave no false impressions in the minds of the jurors or the court.
- E. In all respects, the forensic scientist will avoid the use of terms and opinions which will be assigned greater weight than are due them. Where an opinion requires qualification or explanation, it is not only proper but incumbent upon the witness to offer such qualification.

III. ETHICAL ASPECTS OF COURT PRESENTATION, CONT.

- F. The expert witness should keep in mind that the lay juror is apt to assign greater or less significance to ordinary words of a scientist than to the same words when used by a lay witness. The forensic scientist, therefore, will avoid such terms as may be misconstrued or misunderstood.
- G. It is not the object of the forensic scientist's appearance in court to present only that evidence which supports the view of the side which employs them. They have a moral obligation to see to it that the court understands the evidence as it exists and to present it in an impartial manner.
- H. The forensic scientist will not by implication, knowingly or intentionally, assist the contestants in a case through such tactics as will implant false impression in the minds of the jury.
- I. The forensic scientist, testifying as an expert witness, will make every effort to use understandable language in their explanations and demonstrations in order that the jury will obtain a true and valid concept of the testimony. The use of unclear, misleading, circuitous or ambiguous language with a view of confusing an issue in the minds of the court or jury is unethical.
- J. The forensic scientist shall refuse to extend themselves beyond their field of competence.
- K. Where the expert must prepare photographs or offer oral "background information" to the jury with respect to a specific type of analytic method, this information shall be reliable and valid, typifying the usual or normal basis for the method. The instructional material shall be of that level which will provide the jury with a proper basis for evaluating the subsequent evidence presentations, and not such as would provide them with a lower standard than the science demands.
- L. Any and all demonstrative materials and methods shall be made and utilized according to acceptable practice. They shall not be intentionally altered or distorted with a view to misleading the court or jury, and shall not be unduly sensational.

IV. ETHICS RELATING TO THE GENERAL PRACTICE OF FORENSICS:

- A. Where the forensic scientist engages in private practice, it is appropriate that they set a reasonable fee for their services.
- B. No services shall ever be rendered on a contingency fee basis.
- C. It shall be regarded as ethical for one forensic scientist to re-examine evidence materials previously submitted to or examined by another. Where a difference of opinion arises as to the significance of the evidence or to test results, it is in the interest of the profession that every effort be made by both analysts to resolve their conflict before the case goes to trial.
- D. Generally, the principle of "attorney-client" relationship is considered to apply to the work of a physical evidence consultant, except in a situation where a miscarriage of justice might occur. Justice should be the guiding principle.
- E. It shall be ethical for one of this profession to serve an attorney in an advisory capacity regarding the interrogation of another expert who may be presenting testimony. This service must be performed in good faith and not maliciously. Its purpose is to prevent incompetent testimony but not to thwart justice.



V ETHICAL RESPONSIBILITIES TO THE PROFESSION:

In order to advance the profession of forensic science, to promote the purposes for which the Association was formed, and to encourage harmonious relationships between all forensic scientists, each examiner has an obligation to conduct themselves according to certain principles. These principles are no less matters of ethics than those outlined above. They differ primarily in being for the benefit of the profession rather than specific obligations to society. They, therefore, concern individuals and departments in their relationship with one another, business policies and similar matters.

- A. It is in the interest of the profession that information concerning any new discoveries, developments or techniques applicable to the field of forensic science be made available to forensic scientists generally. A reasonable attempt should be made by any forensic scientist having knowledge of such developments to publicize or otherwise inform the profession of them.
- B. Consistent with this and like objectives, it is expected that the attention of the profession will be directed toward any tests or methods in use which appear invalid or unreliable in order that they may be properly investigated.
- C. In the interest of the profession, the individual forensic scientist should refrain from seeking publicity for himself or his accomplishments on specific cases. The preparation of papers for publication in appropriate media, however, is considered proper.
- D. The forensic scientist shall discourage the association of their name with developments, publications or organizations in which they have played no significant part, merely as a means of gaining personal publicity or prestige.
- E. The NWAFS has been organized primarily to encourage a free exchange of ideas and information between members. It is, therefore, incumbent upon each member to treat with due respect those statements and offerings made by their associates. It is appropriate that no member shall unnecessarily repeat statements or beliefs of another as expressed at NWAFS seminars.
- F. It shall be ethical and proper for one forensic scientist to bring to the attention of the Association a violation of any of these ethical principles. Indeed, it shall be mandatory where it appears that a serious infraction or repeated violations have been committed and where other appropriate corrective measures, if pursued, have failed.
- G. This Code may be used by any forensic scientist in justification of their conduct in a given case with the understanding that they will have the full support of this Association.

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Northwest Connection: Daubert Hearings

District of Oregon: U.S. v. Hudson
by Mike Heintzman
Supervisor, Portland Metro Lab
Oregon State Police Forensic Services Division

The following article was originally published within the January 2007 edition of Dactylogram.

On November 20, 2006 members of the Oregon State Police Forensic Services Division (OSP-FSD) participated in a federal court Daubert Hearing in Portland, Oregon. The questioned case originated from a 2005 gang shootout in Portland in which one individual was killed and an OSP-FSD firearms analyst subsequently identified over 50 shots fired from 5 different weapons. Two firearms were eventually recovered by investigators (but not used in the homicide), and Forensic Scientist Melissa Girardelli identified a single latent print on one weapon to a submitted suspect. The case was eventually taken over by the ATF, and the suspect was charged with a federal Felon in Possession charge. The ATF also sent the firearms to a private laboratory for DNA testing. As a result, both weapons were reported to have the DNA from the suspect.

The defense motion included objections to the use of DNA (didn't obtain samples from every person who may have contaminated the weapon), Firearms (no scientific objective testing, no peer review, no error rate, lack of objective standards for identification), and Latents (no objective standards {number of points}, ACE-V does not meet scientific standards, the identification does not exclude the worlds population, there is no peer review of the science, there is no established error rate, and the criteria for standards and controls are not met). The defense also attempted to use a Daubert objection to testimony concerning gang affiliation, but since gang affiliation isn't based on science, Judge Brown threw that one out.

An analyst from the private DNA laboratory testified to the basis of PCR DNA testing. I testified to the scientific basis of Latent Print Examination, and Forensic Scientist Girardelli testified to the application of those methods in her casework. The OSP-FSD firearms analyst testified last on the scientific basis of Firearms examination. Three independent forensic experts were involved with the defense, although only one – a firearms expert - was at the hearing, but did not testify.

At the conclusion of the OSP-FSD firearms analyst testimony, Judge Brown ruled immediately from the bench that DNA and Latents met the Daubert criteria for scientific admissibility. Judge Brown issued a written opinion on December 7, 2006, which stated in part: "... testing was performed according to standard operating procedures that are generally accepted in the scientific community as reliable techniques used to evaluate both fingerprint and DNA evidence..."

Latent Print Issues:

Forensic Scientist Girardelli and I answered the 5 main Daubert criteria in direct testimony, which included results of studies on both the permanence and identifiability of friction ridge skin, a comparison of ACE-V to the Scientific Method, a description of Analysis and Comparisons as objective functions and Evaluation as subjective (don't shy away from the term 'subjective. The courts accept a subjective conclusion as long as it was based on objective data), a description of the multiple peer review processes we go through, and a description of the OSP Quality system, etc. Testimony also included how OSP's forensic system error rate was calculated, what the individual examiners error rate is (0), and why reliance on CTS tests for discipline wide error determination was a bad idea.

An issue raised by the defense was the lack of a numerical standard used in this country, and the fact that other countries use a numerical standard. This was answered with a combination of the historical perspective of why we at one time had a numerical standard, why that standard was determined to be in error, why we no longer have a numerical standard, what other countries no longer use a numerical standard, and why the countries that still use a numerical standard do so. Part of this testimony, both mine and Forensic Scientist Girardelli's, dealt with the use of Level II and Level III detail in an individualization, and a description of the process of individualization. Emphasis was made on the process as utilizing the whole friction ridge area, not counting points. Testimony was also offered that OSP has a written standard for individualization, which is based on the SWGFAST guidelines.

Another issue that was brought up was contextual and configural biases. This included a brief explanation of what happened in the Brandon Mayfield case. There was a discussion of the effects of bias during both the Evaluation and Verification processes. Refer to the studies by Dr.'s Dror and Busey. Testimony included the OSP-FSD's quality program on handling disagreements between analysts other ways we try to eliminate biases.

One part of the peer review question that was raised was acceptance of ACE-V and acceptance of our evidence processing procedures by the forensic community. We were able to show that that both were accepted practices by referring to the SWGFAST guidelines and our accreditation process, as well as evidence processing using the same procedures done in other labs.

If you find yourself involved in a Daubert hearing, I would strongly suggest that you over-prepare, and fully utilize the available information and resources of other past participants of similar challenges.

District of Oregon: U.S. v. Hudson
By Travis Gover, Firearm/Tool Mark Examiner
Oregon State Police Forensic Services Division

Firearms Daubert Challenge

On November 20, 2006, in the United States District Court for the District of Oregon a Daubert Hearing took place in the case of The United States vs. Corey J. Hudson. The defendant was charged with Felon in Possession of a Firearm. The case in question started as a gang-related shooting in the downtown area of Portland, Oregon. Over fifty shots were fired from five different firearms and over seventy-five pieces of evidence were collected. Shortly after the incident, two firearms were recovered. A latent print and DNA from the defendant were identified on one of the firearms.

In the motion for the Daubert Hearing the defendant challenged the qualifications of the government's experts, the reliability of the experts' testing procedures and conclusions, and the admissibility of the evidence. Disciplines challenged included latent prints, DNA, firearms, and gang affiliation. Gang affiliation was determined not to be based on science and therefore not subject to Daubert Criteria.

In regards to the challenge to Firearms Identification, the defendant objected that three of the four Daubert Criteria were not met. These criteria being: testability of the theory or technique, the theory or technique being subject to peer review, and a known or potential error rate for the scientific technique. The motion targeted the firearms discipline as not having objective criteria for firearms identification without mention of subjective criteria or the AFTE (Association of Firearm and Tool Mark Examiners) Theory of Identification. Observations made during microscopic comparison of bullets, cartridge cases or other tool marks are objective; however, the interpretation of those observations are subjective and based on the examiner's training and experience.

Preparation began two to three weeks prior to the hearing date. Preparation focused not on what we don't do within the Oregon State Police Forensic Services Division Firearms Discipline, but what is done and how it meets the requirements for the admissibility of expert testimony under Daubert. The majority of the preparation time was spent tracking down articles from AFTE Journals, the Journal of Forensic Science, and law review journals. A good source for a list of Daubert related articles as well as articles concerning the consecutive manufacture of firearms components and other tools can be found on the SWGGUN (Scientific Working Group for Firearms and Tool Marks) website www.swggun.org.

Once the Daubert related articles were collected into a binder, the order of procession for the testimony was then determined while educating the U.S. Attorney about the discipline of Firearms Identification and how the Daubert Criteria have been met.

Direct examination explained to the judge that the scientific principle of Firearms Identification is that a tool mark from a firearm or other type of tool is unique and can be identified back to the firearm or tool that made it. It was shown through multiple studies of consecutively manufactured barrels, breech faces, and other tools that after the possibility of subclass marks having been eliminated, the marks left are unique and identifiable back to its original source. It was shown that consecutive manufacture studies date back as early as 1932 by Calvin Goddard and are continued by AFTE members to the present day.

Once it had been shown that the techniques used in Firearms Identification had scientific foundation supported by numerous studies subjected to peer review and publication, the error rate needed to be addressed and explained. It was explained that the error rates used for Firearms Identification are 1.4% for firearms and 4% for tool marks taken from a study by Markham and Peterson of Collaborative Testing Service's (CTS) test results between 1978 and 1991¹. It was explained that these error rates may be artificially high because there was no way to determine how many participants taking the tests were qualified, trained firearm/tool mark examiners. Also, these rates would be expected to be lower with regards to case-work because additional review processes are in place in forensic laboratory systems for the purpose of reducing errors. Confirmation of microscopic comparisons by a second qualified examiner as well as a technical review of the cases notes will lead to a further reduced error rate.

Two common areas of attack against Firearms Identification in Daubert Hearings are the influence of possible subclass marks and the potential of the firearm to change over time. A study by Laura Lopez and Sally Grew published in the Winter of 2000 AFTE Journal showed a "startlingly high correspondence of microscopic characteristics among the bolt faces examined."² This was cited in the filed motion which did not accurately portray all of the findings of the study. It was explained in the hearing that the marks that showed correspondence were concentric circular machine marks that are considered to be subclass marks, not individual, and not used for identifications. It was further pointed out that other machining marks were present that were uniquely identifiable to the individual bolt faces that made them. The motion also referenced an unpublished, non-reviewed research paper regarding the change of breechfaces of 380 Auto Walther pistols within the first three hundred shots. This was said to dispel the basis on which firearms identification had been laid, which was that each tool is uniquely individual and never changing. It was explained that AFTE does not claim that tools or firearms are never changing. On the contrary, tools and firearms do change with use over time and that change helps make each more unique. The change within the first few hundred shots of a firearm is not uncommon until the marks become stabilized in the gun. It has been shown through different studies that the change to a firearm's marking surfaces is so miniscule over time that in most cases it does not preclude an identification. In a worst case scenario, if significant change does occur, an inconclusive result may be reached where no association between the evidence and firearm can be made.

On December 7, 2006, Judge Brown filed an opinion and order for the testimonies for all the scientific disciplines. The opinion for the firearms/tool marks testimony read as follows in the end: "In Summary, the court concludes the proposed expert testimony as to the government's ballistic evidence arising from tool mark analysis is admissible, and the Court's gatekeeping function on this issue is satisfied as required under Daubert.

If faced with an upcoming Daubert Hearing, one can not over-prepare. The more resources you have going into a Daubert challenge and the better you can educate your attorneys, the easier it will be to defend the foundation and principles of your scientific discipline. Daubert challenges are becoming more and more frequent. If you don't have a Daubert notebook it's advised to get one started and be familiar with past challenges to your discipline. One never knows when a challenge will arise and how long you'll have to prepare.

¹ Peterson, Joseph L., and Markham, Penelope N., "Crime Laboratory Proficiency Testing Results, 1978-1991, Part 1 and 2", Journal of Forensic Sciences, Vol. 4 No. 6, Nov 1995, p. 994.

² Lopez, L and Grew, S., "Consecutively Machined Ruger Bolt Faces", AFTE Journal, Vol. 32 No 1, Winter 2000, pp19-27.



Want to learn more about the **DactyloGram** newsletter? **Dactylogram** is available for on-line viewing and archive, courtesy of the Pacific Northwest Division of the International Association for Identification.

Visit www.pnwdiaf.org/publications.php

Thanks to Jon Stimac, Oregon State Police, for permission to reprint Mike Heintzman's article.

Interview with Lt. Elizabeth Carpenter

NFSTC President and (Very Recently) Retired Laboratory Director, Oregon State Police

Lt. Carpenter sat down with the Editor to discuss the goals and projects of the National Forensic Science Technology Center (NFSTC). She has been part of the NFSTC board since 2000, and has served as both secretary and president of the organization. She also provides a brief snapshot of what forensic training programs entailed when she began her career nearly 30 years ago.

How would you describe the mission of NFSTC?

"Science serving justice" is a good short descriptor of what they do. NFSTC was formed by ASCLD in 1995 as an idea that there was an opportunity to join in with Lockheed Martin to use their facilities to further forensic science. There weren't a whole lot of resources going into technology development in forensic science.

NFSTC is a technology center. A lot of people think the "T" is for "training", but the original purpose of the organization was not training but for furthering the technology and the advancement of forensic science. During the first couple years of existence NFSTC was a fee-based organization – doing things like needs assessments for forensic labs, getting involved with developing proficiency testing for horse racing urine testing companies, and other activities that were on the "fringes" of typical forensic science.

How is NFSTC structured?

For several years there were two arms of the company, one that was fee-based and one that was NIJ funded providing services to the public forensic labs free of charge. Some of the fee-based activities included providing laboratory accreditation for some of the laboratories ASCLD/LAB wasn't interested in, for example some of the private DNA and single-function laboratories. NFSTC also provided DNA Technical Leader services on a contractual basis. The two sides of the company were confusing to the public as to whether services were free or fee-based. There was also confusion because NFSTC was offering ISO accreditation services and ASCLD/LAB was offering non-ISO accreditation under the Legacy program. Once ASCLD/LAB provided services for ISO accreditation, the public became very confused because now there was a competitive market.

The Board of Directors made a decision in 2004 to totally separate the fee-based arm of the organization with the grant-funded arm. The fee-based side became Forensic Quality Systems (FQS) and NFSTC is a totally separate organization. Currently, NFSTC is funded through grants from the National Institute of Justice, Environmental Protection Agency, Department of Defense, and some other funding streams to provide support to the public forensic community. The NFSTC has some very strong core competencies in technology and in distance training. It's a very high tech organization, and is loosely associated with Forensic Resource Network (FRN), a group of organizations primarily funded through NIJ. The benefit of working with these organizations is that each has core competencies that can be matched with the other organizations; giving NIJ the opportunity to use these different organizations for projects they feel are worthwhile and have available funding.

Interview with Lt. Elizabeth Carpenter

What are some of the current projects that NFSTC is working on?

The NFSTC is heavily vested in the President's DNA initiative. They have developed distance learning for prosecutors and officers of the court on DNA, a modular training program that a prosecutor can use to learn about subjects such as population genetics. There is also a DNA analyst distance training program, which is particularly useful for laboratories who are either training a lot of DNA analysts at one time, or for the smaller laboratories that don't have a lot of resources. In addition, NFSTC assists with performing external DNA audits and grant program assessments for NIJ.

OSP's Ontario lab participates in the Field Investigation Drug Officer (FIDO) program, which gives laboratories the ability to assist with competency and proficiency training for field investigators performing field drug tests, and gives the courts confidence that tests are being done correctly and accurately. FIDO makes the system more efficient by keeping some drugs out of the laboratory and can expedite the process for prosecuting drug offenses.

Why did you choose to get involved with NFSTC?

I chose to get involved with this organization because the work that they were doing was very innovative. Most boards that I've sat on have all volunteers, and are more "maintenance-type" boards. This particular organization always has something happening, and there were some very remarkable people involved in the board from the very beginning. It gave me the opportunity to step out of Oregon and see what was happening in the rest of the U.S. It's a very nimble organization that can get things done and get things done quickly. That's not true in most forensic organizations, where the thinking can be very bureaucratic with a lot of red tape to get through. The benefit NFSTC had is that they were an independent organization – if the community needed something, three days later it could be done.

How can NWAFS members learn more about NFSTC?

If there is an interest in a project or an interest in something the NFSTC can do, just give them a call. If nothing else, it's a huge think tank that knows where everything is, who's doing what – that's what I have been so impressed with about the organization. If I want to know what's happening nationally with missing persons, I give them a call. If I want to know if anybody is doing validation with something to do with latent prints, I give them a call. Visit their website, www.nfstc.org.

You've seen a lot of change during your forensic career. What was your early scientific training like at OSP?

When we started back in the dark ages (1977), we were kind of "jack of all trades, basically experts of none". Everyone was hired to do the same job – everyone was a Criminalist; we all did crime scenes, chemistry, biology, firearms; We did all of the disciplines in the lab. At that time latent prints and questioned documents were in a different part of the Department. The first case I testified on was a homicide. I did work in serology, firearms, as well as the crime scene. You could classify us as police officers interested in applying science to physical evidence; now, the laboratory is made up of scientists applying their skills to benefit the criminal justice system. We all went through recruit school and depending on the mindset of the leadership at the time, some people worked the road as patrol officers first, and some people went directly to the lab.

When I began training, there were no big white Procedures notebooks. We took no notes...Training in the laboratory was a mentoring program, learn as you go while asking lots of questions. The quality assurance program is much better now, although things were a lot more fun back then! Today, the public can have a lot more confidence in the work that's coming out of the laboratory.

***Thank you, Lt. Carpenter,
and enjoy your retirement!***

Training Opportunity

The Examination of Tire Track and Tire Impression Evidence

William J. Bodziak, instructor

September 24-28, 2007

Course Description: This is a five-day course for forensic tire examiners who must examine tire and tire track evidence and testify to their findings. It covers all aspects of both tire tread and tire track evidence, including basic information regarding tires, tire molds, and tire manufacturing, tire retreading, dual tired vehicles, special crime scene recovery considerations, methods of taking known exemplars of tires, the comparison process, evaluation of class and identifying characteristics, report writing and numerous comparison exercises. It is geared toward both new and experienced tire examiners. It is also of value for those who normally only recover tire evidence, even though they may not examine the evidence.

Class size is limited to 20 students. Casual attire recommended as some practical exercises will involve handling of tires and casting materials.

Registration Cost: \$600 per student
 Includes text: *Forensic Tire Impression Identification* by Lawren Nause

Location: Oregon State Police, Portland Metro Forensic Lab
 13309 SE 84th Ave., Suite 200
 Clackamas, Oregon 97015

Contact: Rhonda Banks
 Oregon State Police, Portland Metro Forensic Lab
 13309 SE 84th Ave., Suite 200
 Clackamas, Oregon 97015
 rhonda.banks@state.or.us
 503-451-2308

Name: _____

Email address: _____

Agency: _____

Street Address: _____

City: _____ **State:** _____ **Zip:** _____

Phone: _____ **Fax:** _____

Payment in the form of a check must be received prior to the date of the course. Checks should be made payable to William Bodziak.

Seats will be reserved on a first come basis and will be guaranteed only with full payment. Reservations can be made at the Courtyard Marriott Portland Southeast (503) 652-2900 under "OSP Forensics".

Full refund of payment will be made on cancellations made by August 31, 2007.

Refunds will be made after August 31, 2007 only if the space can be filled from the waiting list.

NWAFS/SWAFS Fall 2006 Meeting Technical Paper Abstracts

Applied Biosystems Product Update

CABALLERO, Catherine

Applied Biosystems, 850 Lincoln Centre Drive, MS 404, Foster City, CA 94404

Part 1: Developmental Validation of the AmpFLSTR® MiniFiler™ PCR Amplification Kit: a 9-plex miniSTR Assay for the Analysis of Compromised DNA Samples

Forensic DNA typing is facilitated by the employment of highly polymorphic STRs. Despite their relative small size (100-400 bp), DNA degradation due to environmental exposure could result in a lack of sufficient intact target fragments to generate a complete genetic profile. The problem is magnified when large multiplex STR reactions are used due to the wide fragment size range of the amplified PCR products e.g. the largest STR loci fall below the detection limit due to preferential amplification of the smaller loci.

In recent years, successful recovery of information from degraded DNA samples has been accomplished through reduction of the size of the STR PCR products by moving primers in as close as possible to the STR repeat region. In an effort to increase the amount of information derived from compromised DNA samples, we have redesigned as miniSTRs the largest eight loci in the AmpFLSTR® Identifiler™ PCR Amplification Kit (D7S820, D13S317, D16S539, D21S11, D2S1338, D18S51, CSF1PO, FGA). Five of these loci (D16S539, D21S11, D2S1338, D18S51, and FGA) also represent five of the largest loci in the AmpFLSTR® SGM Plus® kit. Size reduction of the STR amplicons ranged from 33 to 208 bp. This highly informative 9-locus multiplex, which includes the sex determining locus Amelogenin, employs a 5-dye labeling technology and mobility modifiers to enable simultaneous CE separation of the DNA fragments. In this presentation, results from a developmental validation study of the AmpFLSTR® MiniFiler™ PCR Amplification Kit will be described.

Part 2: Streamlining the Validation of New Forensic DNA Technologies

As the demand for processing DNA evidence has continued to grow, so has the development of new technologies for DNA analysis. These factors can make it difficult for a crime laboratory to strike a balance between successful case workload management and the evaluation and implementation of new technologies. Laboratory Accreditation and Forensic DNA Analyst education require careful assessment and thorough validation studies to provide confidence in the DNA results, ensuring the generation of robust, reliable and reproducible data.

There are a variety of challenges the Forensic DNA laboratory faces when implementing a new methodology. A common challenge identified by laboratories is a lack of resources available for validation. Laboratories also point to the existence of diverse opinions with respect to validation protocols, sample numbers and definition of appropriate and effective experiments as notable challenges. These variables have been shown to contribute to extensive validation studies that include unnecessary or excessive tests without the benefit of additional confidence. In addition, data management and analysis are cumbersome processes that are often manual operations or utilize a series of tools which analysts have developed on their own.

This presentation will introduce attendees to time-saving tools and services developed by Applied Biosystems to significantly streamline the validation of new forensic DNA technologies. First, VALID™ is a software program designed to help support, simplify and standardize validation studies while meeting SWGDAM/DAB recommendations. This is accomplished by incorporating the following functionality:

- Easy to use software program with a simple graphical user interface
- Experimental design tools and recommendations
- Integration of all portions of validation and workflow processes
- Calculation and data analysis tools
- Project and documentation management—including final report capabilities

Second, Applied Biosystems has created a Validation Support Services program, which provides the resources, manpower and deliverables to complete validation efficiently and effectively. In partnership with the client laboratory, and under the direction of the laboratory director, technical leader and quality assurance manager, Applied Biosystems executes the necessary validation experiments, including data analysis and reporting, to get instruments and chemistries on-line as quickly as possible while meeting all SWGDAM/DAB auditing and accreditation standards.

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Applied Biosystems Product Update, cont.

Part 3: Quantifiler® Kit and Allelic Ladder Updates

As the Quantifiler® Human DNA Quantification kit assays are increasingly adopted by human identification laboratories there have been requests for more information regarding the extent of variability in the assays. This presentation will discuss some of the factors that may contribute to variability within a single quantification method, some observed differences between various quantification methods and studies performed at Applied Biosystems to assess tube-to-tube and lot-to-lot variation in the Quantifiler assay. The manufacturing quality control procedures and expected range of variation in the Quantifiler DNA standard will be discussed with the aim of providing guidance to Quantifiler kit users for achieving optimal results. The presentation will also discuss results which may be obtained for non-template controls and emphasize procedures to minimize the detection of positive results for extraction blank and negative control samples. Finally, an overview of upcoming changes to the manufacturing procedures for the AmpFLSTR® kit allelic ladders will be provided with a summary of validation studies conducted to verify allelic ladder performance.

A Partnership Between Crime Laboratory Directors in the Southwest and Texas Tech University Health Sciences Center, Institute for Forensic Science SPERRY, Kathy, and James M. Childers

Texas Tech University Health Sciences Center Institute for Forensic Science would like to invite crime laboratory directors in the Southwestern United States to be part of a proposed coalition to provide insight into educational and research needs within the fields of forensics and law enforcement.

Historically, there has not been a cohesive collaboration between practitioners and academic research and higher education. Texas Tech University Health Sciences Center Institute for Forensic Sciences is going to be one of the few universities that transform this historical phenomena.

One of the primary objectives of the Institute is to establish a dialogue that leads to a communication network of practitioners and the Institute. The Institute in conjunction with the Texas Tech University Health Sciences Center, Texas Tech academic campus, and the Texas Tech School of Law are in the process of establishing a Master's degree in forensic science. The development of a graduate degree has included input from numerous crime laboratory directors and other forensic professionals. The degree program has been designed to meet the challenges facing the criminal justice system. A primary focus of the degree program will be directed towards preparing graduates with the requisite knowledge and the necessary skills to enter the forensic field.

CRIMESCENE is the official publication of the Northwest Association of Forensic Scientists. It is published four times a year in the months of February, May, August, and November. The Newsletter welcomes submissions from its membership, such as: technical tips, case studies, literature compilations, workshop or training notifications, reference citations, commentary, historical accounts, and other topics of interest to the membership. Please submit material for publication in Microsoft Word for Windows format as an e-mail attachment. For more information regarding the Newsletter or to make a submission please contact Kori Barnum at kori.barnum@state.or.us.

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***In Situ* Identification of Nickel Titanate and Chrome Titanate in Automotive Paints Using Extended Range FT-IR Spectroscopy (4000-220 cm⁻¹) and XRF Spectrometry**

SUZUKI, Edward M.

Washington State Crime Laboratory

The identification, analysis, and occurrence in U.S. automobile original finishes (1974-1989) of Nickel Titanate and Chrome Titanate are described in this presentation. These two inorganic pigments have lemon yellow and golden yellow-orange hues, respectively.

The titanate pigments are based on the rutile (titanium dioxide) structure and there are only minor differences between the infrared absorptions of rutile and the titanates. Titanate pigment absorptions in paint spectra can thus be easily mistaken for those of rutile. Each of the titanates, however, contains two elements in addition to titanium that can serve to distinguish them using elemental analyses. Extended range FT-IR (4000-220 cm⁻¹) and XRF instruments were thus used in combination for the in situ analysis of the titanates.

In addition to titanium, nickel, and antimony, the three main detectable elements comprising Nickel Titanate, all of the commercial products of this pigment that were examined by XRF (using a tin secondary target) contained impurities of zirconium, niobium, and usually lead. These elements were also detected in most of the paints in which Nickel Titanate was identified, as well as in the Chrome Titanate pigments and paints. The relative levels of these elements vary, particularly the zirconium to niobium ratio, and this can serve to distinguish further paints containing a specific titanate pigment. These impurities arise primarily from the ores that are used to produce anatase, which in turn is used to produce the titanates. Additional zirconium may result from degradation of the dispersion beads that are used in the manufacture of the paint, if zirconium oxide beads are used.

Nickel Titanate is a relatively common pigment that was identified in nearly three dozen U.S. automobile yellow nonmetallic monocoats (1974 to 1989) from the Reference Collection of Automotive Paints (Collaborative Testing Services). Chrome Titanate appears to have been used in only a few yellow and orange nonmetallic monocoats. The use of the titanate pigments likely increased after this time period as they were replacements for lead chromate pigments, which were last used in a U.S. automobile original finish in the early 1990s. Titanates likely also become more common after 1989 because of the increasing prevalence of basecoat/clearcoat finishes. Heavy pigment loads are required with the titanates to achieve the vivid colors typical of many automotive finishes, and this makes it difficult to achieve a high gloss finish in the monocoat. This is not a problem with the basecoat/clearcoat finish, however.

Correlation of Physical Appearance of Hair Roots to Success Rate of Nuclear DNA Analysis

BANKS, Rhonda

Oregon State Police Forensic Laboratory

The ability to visually assess the potential success of nuclear DNA analysis of a hair root would be a valuable tool in making decisions regarding the consumption of hair evidence and its use for nuclear versus mitochondrial DNA analysis. This survey presents a compilation of data gathered from DNA analysis of hair roots in an attempt to determine if a correlation can be drawn between the physical appearance of a hair root and the ability to obtain a nuclear DNA profile.

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Comparison of Five Forensic DNA Extraction Methods

KUPFERSCHMID, Timothy D., and Jonelle Thompson

Sorenson Forensics, 2495 S. West Temple, Salt Lake City, UT 84115

Many different extraction protocols are being used in the forensic community. One critical factor in choosing an extraction procedure is the ability to minimize the amount of inhibition present in an extract. Organic extractions are well known for removing a majority of the inhibitors. However, an organic extraction is a long, manual process that is not automatic.

Four different extractions were chosen, DNAIQ (Promega), ChargeSwitch (Invitrogen), Qiagen MicroPrep (Qiagen), and ForensicGem (ZyGem) in an effort to find an extraction procedure capable of being automated. Each extraction method had to have the ability of organic extractions to reduce the amount of inhibitors, while still obtaining a suitable quantity of DNA for STR analysis. To evaluate the efficiency of the procedures, both quantity and quality of DNA were compared.

Initially, two magnetic bead systems, DNAIQ and ChargeSwitch, were run following the manufacturers' protocol. Different fabric types with a variety of dilutions of blood were extracted. The quantitation results showed some evidence of inhibition. Modifications were made to each extraction protocol in an effort to optimize the extraction method. The second round of extractions was performed with a subset of the samples. The results showed reduction in inhibition, while increasing the amount of DNA isolated.

Subsequently, all five extraction methods were evaluated using challenging fabrics with blood, touched items, buccal swabs, hair, and cigarette butts.

This presentation will discuss which extraction was chosen for use in our laboratory. The protocol was chosen based on the quality of data compared to the organic extraction method currently being used in our laboratory.

Differential of Hair Dye Using Forensic Laboratory Instrumentation

CRAGO-STASICHA, Devin, and Stacey Walker

Texas DPS

The purpose of this study was to determine if different hair dyes that exhibited similar coloration could be differentiated using instruments in the forensic laboratory. To keep this introductory study manageable, only 10 commercially available hair dyes (six red and four black) were used. Fifteen people donated hair standards and each hair standard was dyed with the different brands of hair dye. The hair comparisons were performed within each group to eliminate varying hair characteristics as a factor for discrimination. Analysis of these hairs was conducted with the following instruments: the comparison microscope, the Fourier Transform Infrared Spectrometer, Thin-Layer Chromatography, Pyrolysis Gas Chromatography/Mass Spectrometry, and the Microspectrometer. As was expected, the comparison microscope proved to be the most discriminating tool in distinguishing between different hair dyes. However, there were a few instances where the dyes were close enough in color that they appeared microscopically similar or inconclusive. For those hairs, the Microspectrometer proved to be reliable in distinguishing between two different dyes of similar coloration. The remaining instrumentation did not yield any useful results.

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A New Type of GC/IR for Forensic Drug Analysis

KEARNEY, Tom, and Bob Shipman

Spectra Analysis, 257 Simarano Dr., Marlborough, MA 01752

The typical forensic laboratory has a heavy drug caseload and encounters drug exhibits, which often contain mixtures of compounds in addition to any regulated component. To meet analytical requirements and caseload demands, the forensic laboratory relies upon GC/MS to perform routine drug analysis by employing a technique that allows automated sampling, separation, and subsequent structural identification. Mass spectrometry does have limitations with some drugs yielding minimal mass spectra or similar spectra between compounds.

Infrared spectroscopy is also used for forensic drug analysis, is useful for the identification of compounds with similar mass spectra, and can differentiate diastereomers (pseudoephedrine/ephedrine) which cannot typically be identified using MS. The routine application of IR spectroscopy, however, is time consuming since the technique is not typically amenable to automation and the instrument requires samples to be relatively adulterant free, often requiring some sample preparation.

We report on an instrument that links gas chromatography to infrared spectroscopy to allow an automated approach to the IR analysis of drug samples. The technique abandons the "classical" light pipe approach for a direct deposit technique which focuses the GC effluent on a ZnSe window cooled with liquid nitrogen. The window moves to allow discrete sampling of the eluted components by FT-IR. Inclusion of an autosampler allows unattended automated analysis. The instrument yields excellent IR spectra and has good overall sensitivity for drugs of interest. The instrumental design and spectra from a variety of compounds will be discussed.

Using a Single Nucleotide Polymorphism Assay to Differentiate Skeletal Remains From Past Military Conflicts

WADHAMS, Mark J., Rebecca S. Just, Michael D. Coble, Thomas J. Parsons, Carla D. Paintner, Jennifer E.

O'Callaghan, Jessica C. Spangler, Timothy P. McMahon, Suzanne M. Barritt-Ross, and Louis N. Finelli

USA AFDIL, 1413 Research Blvd., Rockville, MD 20850

The Armed Forces DNA Identification Laboratory (AFDIL) was established in 1991 for the purpose of using novel DNA technology to identify recovered skeletal remains from past military conflicts. Remains encountered in AFDIL casework have a post-mortem interval in the range of ~30 to 65 years and thus are typically too degraded for standard STR typing. In these cases mitochondrial DNA (mtDNA) sequencing of the remains and comparison to mtDNA profiles from maternal relatives is routinely used for identification. In some instances, however, we encounter matching or nearly matching hypervariable (HV) region profiles from multiple reference families, thus preventing identification. This is due to the presence of several common HV haplotypes, one of which is observed in over 7% of the Caucasian population. The development of a single nucleotide polymorphism (SNP) assay that utilizes sites within the control region outside of the two hypervariable regions (HVI/II) and in the coding region of the mtDNA genome, increases the discriminatory power of the mtDNA. An 11-plex SNP assay (Panel "A") has been applied successfully in AFDIL casework to discriminate skeletal elements that could not be differentiated on the basis of HVI/II sequence data. This SNP assay will allow AFDIL to make more identifications in cases that would otherwise remain unresolved. The utility and limits of this technology will be discussed, along with case specific examples and the validation of other SNP assays at AFDIL.

Beyond Samples: Track and Control Everything that Affects Quality

HARTEN, Bill, and Carl Hull

UNICConnect LC, 888 West 2000 So., Woods Cross, UT 84087

A great evidence tracking system must do more than log samples and outcomes in a database. Sample quality and integrity depends on the quality of every element affecting the process, or every link in the chain of custody. Catching and preventing problems requires tracking intermediate containers, thorough validation, and capturing required information at each step along the way. People, reagents, and instruments require their own processes, traceability, and controls to ensure the highest quality and confidence. Authorization and training, instrument calibration and maintenance, and reagent QC and inventory are a few of the sub-processes that benefit from effective tracking and integrated control.

This presentation explains the quality factors we can track, how control is applied and how every sample has its own chain of custody history that is created and stored forever. Modifying the tracking system to meet the unique requirements of every forensic lab will also be addressed.

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Optimizing Blood Alcohol

RUPPEL, Tim

Perkin Elmer, 710 Bridgeport Ave., Shelton, CT 06484

Blood Alcohol Content (BAC) is often analyzed by headspace/gas chromatography. The variables in method parameters will be discussed toward the goal of method optimization. Parameters of headspace will specifically focus around balanced pressure sample introduction headspace (PerkinElmer). Many parameters will be similar if using GSV headspace instruments (Agilent and Tekmar). Parameters on the GC end of the analysis will be discussed also. Requests of the author from many forensic laboratories have resulted in upgrading blood alcohol applications. Examples will be presented showing higher throughput and routine screening of other analytes such as sniffer inhalants and ethylene glycol. As time permits, a short discussion will follow on headspace/GC without the use of pressurized cylinders.

More on Matching Matches

HOPEN, Thomas J., Chris Taylor, Larry Peterson, and Walther Rantanen

ATF Forensic Sciences Laboratory, US Army Criminal Investigation Laboratory, Georgia Bureau of Investigation, Integrated Paper Services, Inc.

Matching Matches, Part 1, was presented last year at the Joint Orlando and this presentation dealt mainly with the examination and comparison of paperbook matches based on their physical characteristics. This presentation will address a supplemental physical feature useful when conducting a match examination which was not addressed in Part 1. In addition, this presentation will discuss examination and comparison of matches by PLM, SEM-EDS, XRF, TLC, microspectrophotometry, as well as the use of Photoshop® in the comparison of the match stem color.

* DON'T FORGET - NEWSLETTER GOING DIGITAL SUMMER 2007 *

Beginning with the Summer 2007 edition, our newsletter will be going exclusively digital. Instead of receiving hard copies of the newsletter, it will be posted to a "Member's Only" section of the website, and you will receive an email notification that a new edition of the newsletter is posted. In order to continue to receive the newsletter, you must have 1) an email address, and 2) be added to our NWAFS Yahoo Group by our webmaster, Jeff Borngasser.

If you'd like to confirm you are already on the NWAFS Yahoo Group, please follow these steps:

- log on to www.groups.yahoo.com
- where it says "Already a Yahoo Groups Member?", select "Sign In"
- enter your Yahoo User ID and password
- if you are signed up, you will see a "My Group" section in the upper left corner of the page, with "NWAFS" listed as one of your groups

If you are not currently signed up to the Yahoo Group, please visit www.nwafs.org, go to the Membership Roster section, and click on the link at the bottom to add or modify your information. If your information is correct on the membership roster, then please choose "add to Yahoo Group" in the "Organization" field of the form. Once Jeff has added you to the group, you will receive a confirmation email with instructions on how to log in to the Yahoo group site. If your information is incorrect, please update your information and select "Submit Form".

One of the concerns in the past with providing newsletters and other member-specific information on the www.nwafs.org website was that it wasn't fair to make information available to individuals who may not be active, dues-paying members of the organization. By creating a special "Member's Only" section on the website, which will be password protected, we have resolved this issue. We will send the User ID and password to the "Member's Only" section out to the membership soon, via the Yahoo Group distribution list. Please take the steps outlined above to confirm your information is current on the Membership Roster and that you are a member of the Yahoo Group; this will ensure that you have ready access to the "Member's Only" area of the website.

If you have any questions about the digital transition, please contact me at koribarnum@state.or.us or (503) 451-2276.

* DON'T FORGET - NEWSLETTER GOING DIGITAL SUMMER 2007 *

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**Congratulations to last issue's
Caption This winner**

**Devin Mast
 Oregon State Police
 Ontario Crime Laboratory**

**"In an effort to genetically modify a
 marijuana plant to produce PCP,
 this pothead became confused and made
 the plant produce PVC".**