TWGDAM/SWGDAM RETROSPECTIVE
NOV 1988 TO JULY 2015

26+YEARS OF COLLEGIAL DISCUSSION (& SOME ARGUMENT)
YEARS OF LEADING THE WAY IN FORENSIC SCIENCE
TO DEVELOP AND IMPLEMENT NEW TECHNOLOGIES AND ESTABLISH STANDARDS
TO ENSURE QUALITY AND COMPARABLE RESULTS ACROSS NORTH AMERICA

(STATEMENTS MADE HERE ARE MY OWN & NOT A REFLECTION OF OFFICIAL CAL DOJ OR FBI OPINION)
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<th>PGM/PGM sub</th>
<th>DNA RFLP</th>
<th>Core STRs</th>
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*After Brian Wraxall's CAC Founder's Lecture 1993*
TWGDAM & SWGDAM EXPERIENCE

Interesting Historical Observation — Officially FBI Changed the name of the “Technical” Working Groups to “Scientific” Working Groups “to distinguish them from other similarly tasked groups sponsored by the United States Department of Justice.”

Perception on the Ground -- that politicians, other more established groups and scientists, as well as the public might assume that “Technical” meant we were a group of “Technicians” rather than Forensic Scientists

What About New SWGs?
The New SWG

These episodes seem relevant:

4.1 An Empire Divided
4.2 Jump to Light speed
4.3 Rage of the Wookiees
4.4 Trials of Obi-Wan

Where did these pieces come from to make up Dr. Butler’s 5 components to ensuring Forensic DNA Results?

*From numerous NIST Presentations by Dr. John Butler*
‘70s - Several emerging factors influenced Forensic Science development:

- 1965-1973 - Increases 83% overall & > 90% in violent crimes req’d political action
- 1967 - President’s Comm. Report - Solving crimes req’d discovery & scientific analysis of physical evidence from crime scenes
- 1968 – Established Law Enforcement Assist. Admin. (LEAA) w/funding for State & Local Law Enforcement (LE)/crime labs
- 1968 – 3 early LEAA studies of Mass. crime labs show LE uses forensic evidence more readily when labs are closer/more local

Massive infusion of LEAA funds triples State and Local crime labs from 100 to 300 “overnight”

- 1973 – New FBI Dir. Clarence Kelley fosters FBI professional and research relationships with state and local crime laboratories
- Late 70’s Forensic Sci Fdn. funded to implement certification in forensic science – “Criminalistics” last to participate
- 1973 – 1977 FSF proficiency testing project identifies issues with various forensic evidence types, including bloodstain typing
- 1981 – For Sci Res & Trng Ctr established by FBI (w/mandate for training, education, applied research, and as information resource)
- 80’s – major breakthroughs, e.g., DNA; estab forensic databases (incl prints/firearms), certification & lab accreditation programs

Proficiency Testing often informal- with no outside review

Ensuring Accurate Forensic DNA Results

Voluntary (ASCLD/LAB) Accreditation & Certification

Proficiency Testing of Analysts

Validations, but not standardized

General Situation in late 70’s & 1980’s

*From numerous NIST Presentations by Dr. John Butler
BACKGROUND – FORENSIC SCIENCE INTER-LABORATORY COMPARISONS in 1970-80s

• Automated Fingerprints development

• Incompatible proprietary formats -- East vs West coasts

• Primarily FBI/Rockwell
  (RFP 1970 after Henry/Voelker systems)

• California/US West w/NEC
  (originally SFPD RFP & then CA DOJ via RFP)

• Now operate via interfaces to NIST standard formats

Similar issues later with FBI NIBIN/ATF – FA bullet/casing imaging technologies competing
BACKGROUND — FORENSIC SCIENCE
INTER-LABORATORY COMPARISONS in 1970-80s

• **Forensic Biology** was Forensic Serology — most laboratories had standardized on the “Group I, II, and III” for isozyme typing allowing comparisons between labs (PGM, EAP, Hp, etc.)

  • Meetings held, like Int’l Symposium on Sex Assault Evidence

Semen free vaginal swab analysis (Bud Stuver and FBI rep meet with Deputy Director)

  • Beginnings of Accreditation and Certification more frequently accepted among serologists (vs FA/TM, etc.)

• **California Association of Criminalists** – UNISYS- BFS

  Forensic Serology Symposium 9/87
BFS-CAC-UNISYS Forensic Serology Symposium

Report Now Available

The report of the 1987 Symposium on the Practice of Forensic Serology, co-sponsored by the California Department of Justice- Bureau of Forensic Services, the California Association of Criminalists, and the Unisys Corporation is now available. This report contains the documents produced by the five working groups:

1. Quality Assurance
2. Standards of Training
3. Recording, Collection, and Preservation of Physiological Stain Evidence
4. Method Evaluation
5. Interpretation and Reporting of Results

This report is available for $15.00. If you would like a copy of the report, send a check payable...
OTHER PRECURSORS TO 1ST TWGDAM MEETING

• 1953 – Watson & Crick ID structure of DNA
• 1963? – London Metropolitan Police estab. 1st Genetic Offender DB
• 1980 – Dr. Ray White - restriction enzyme digestion of VNTRs/RFLP
• (1983 – California passes establishes 1st US Genetic Dbase of sex offenders SB 809, PC 290.2, originally PGM/secretor type, later DNA)
• 1987 – 1st US cases worked by Lifecodes and Cellmark
INITIAL FORAYS into DNA TYPING by FORENSIC LABS DIVERGE – 1987-1988

- Cellmark-Hinf1 restriction, 5 bp cutter (Jeffrey’s multi-locus probing, later migrated to single-locus probes)
- Lifecodes-Pst1 restriction, 6 bp cutter (Baird, etal. , includes Arty as QA Manager)
- VA DFS opens as Pst1 based RFLP Lab (incl Rich G./NY-Nassau Co Crime Lab, Scott Wanlass to follow)
- FBI – Hae III, 4 base cutter
SOCIAL SCIENCE of “AGENCY & STRUCTURE”
Dissertation by Dr. Linda Anne Derksen Apr 2006
“THE STABILIZATION AND STANDARDIZATION OF A NEW TECHNOLOGY” UCSD

Reflects Genius of James Kearney & FSRTC staff
(Implementing clear intent of FBI policy)

- Sought “Simplified Standardized” DNA techniques and protocols
  - Increased probability of creating successful knowledge or accepted belief
- Established a “Community of Practice” based on “Shared Norms of Practice”
  - before knowledge can be created or diffused, must form a community of practice
FBI Provided and Encouraged

1. Utility of DNA to type tissues not easily typed (separate sperm from epi)
2. Facilities, resources, & coordination provided by FBI (Derksen indicates “validation was done at FSRTC”)
3. Knowledge and technology transfer and community building
4. In house publication in Crime Lab Digest
5. Affiliation with ASCLD (& consequently ASCLD/LAB)
TIMELINE at the FBI/FSRTC

• 1984 – Dr. Carl Merrill Lectures at NIH - mito DNA sequencing’s potential – Awarded FBI contract

• 1985 – Budowle (hired ‘83) visits & studies RFLP/VNTR w/Dr. Ray White @Howard Hughes Inst. Univ of Utah (D2S44, e.g.) “begins FBI DNA research”

• 1987 – Sep – Dr. Alec Jeffreys’ Symposium @ FBI (80 sci) FBI visits Cellmark, Forensic Science Service in UK, Lifecodes in US – FBI DNA Research Team established

• Spring 1988 – Toronto “pre-meeting” of US & Canadian researchers on DNA typing (Ken hired @CA DOJ fm MT Crime Lab Feb 1988)
TIMELINE at the FBI/FSRTC

- June 1988 – FBI hosts International Symposium on DNA Technology in Forensic Science (54/100 incl. kck, G S, Blake...10 hr video)
- July 1988-Visiting Scientists Program
- Nov 1988 – First TWGDAM meeting in Quantico
  - Up to 4 TWGDAM mtgs/yr, 10 meetings by 7/92
- Oct/Dec 1988 1st FBI RFLP Casework RFLP and Molecular Biology crs (40 students- 1 month at Quantico Ken @2d, June 1989)
- 1990 CODIS national pilot program begins (B Browns “13’s”)
NOV 1988 First Meeting - Technical Working Group

• This first meeting was hosted by the FBI Laboratory and included 31 scientists representing 16 forensic laboratories in the United States and Canada. This first meeting was designed to bring together those scientists who were engaged in validating this new technology to share protocols and establish guidelines, where appropriate.
Technical Working Group on DNA Analysis Methods

Purpose

- “To pull together a select number of individuals from the forensic science community who are actively pursuing the various DNA analysis methods
- To discuss the methods now being used
- To compare the work that has been done
- To share protocols
- To establish guidelines where appropriate”

- Bring Data & Protocols - worst autorad interpretations/troubleshooting
Technical Working Group on DNA Analysis Methods

- At the first meeting, a subcommittee was established to formulate suggested guidelines for a QA program in crime laboratories conducting RFLP DNA analysis.
- Chaired by James Mudd, the group developed guidelines “intended to serve only as a guide to laboratory managers in establishing their own QA program for DNA RFLP analysis.”
SOME SCIENTISTS & PERSONALITIES W/MAJOR IMPACT (IN EARLY YEARS)

Dr. Bruce Budowle
FSRTC Research
Now at UNT

Dr. John Waye
(former RCMP-now McMaster Univ.)

Dr. Ron Fourney
RCMP
Now National Dir Services & Research

Dr. Pam Newall
Former DNA Lab Dir. Center of Forensic Services, Toronto—retired/consulting
SOME SCIENTISTS & PERSONALITIES WITH MAJOR IMPACT
(IN EARLY YEARS)

Dr. Ron Fourney
RCMP (2011)
Now National Dir
Services & Research

Dr. Ron Fourney with Dr. John Bowen
SOME SCIENTISTS & PERSONALITIES W/MAJOR IMPACT (IN EARLY YEARS)

Dr. Sam Baechtel
(FSRTC Research
Later FBI DNAU)

Jill Smerick
FSRTC
(circa 1993)
Technical Support

Dr. Keith Monson
FSRTC
Imaging & IT
FBI RESEARCH GROUP- JAMES KEARNEY/BUDOWLE

- Dr. Dwight Adams – RFLP environmental insult/CW
- Dr. F. Sam Baechtel – DNA extraction methods
- Dr. Catherine (Cate) Comey – “tracking status of PCR”
- Dr. Harold (Hal) Deadman - hair extraction/DNA quantitation/CW
- Dr. Keith Monson – IT/Image analysis – “PC God”
- Dr. James Mudd - QA
- Dr. Randy Murch - RFLP/CW
- Larry Presley - RFLP/CW
- Also Dr. Barry Brown – Crime Lab Digest/CODIS White Paper
TOPICS of 1ST of TWGDAM MEETING SERIES

- Feb 1989 - 27 from 16 labs + G. Sensabaugh/Ray White
  (essentially same topics in Nov 1988) (& Dr. Dennis Reeder/NIST)
- Lab validation & preparations for casework updates
- RFLP methods in working CW labs, FBI, RCMP, VA
- DNA Extraction methods
- Status PCR
- Population dbases RCMP, FBI, Nassau Co
- Demo of “PC God” Automated Reading System for DNA Autorads
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• Jun 1989 2d International Symposium on Forensic Aspects of DNA
• Jun 1989 – 27 from 17 labs + GS/RW
  • Comparison of DNA methods recovery rpt (Terry Laber MN)
  • 2 Gps - QA – Guidelines finalized - issued 1989
    - DNA Databasing Requirements “NDPDS Theoretical Model” (1990)
• Presentations by vendors: Promega, Cellmark, Collaborative Research, Cetus, Lifecodes
• Population dbases: Baird - Lifecodes, Budowle/Waye – FBI/RCMP, Forman – Cellmark
Ensuring Accurate Forensic DNA Results

Voluntary (ASCLD/LAB) Accreditation & Certification

Proficiency Testing of Analysts (informal- no outside review)

TWGDAM Guidelines

Validations but no SRMs yet

Situation After TWGDAM Guidelines 1989-1992
TOPICS of 1ST of TWGDAM MEETING SERIES

• 1990 –
  • Proficiency Test Guidelines
  • Revised TWGDAM Guidelines to include PCR w/CAC pub 1991
  • CODIS White Paper Published
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JULY '91 TWGDAM AND DBASE PILOT PROJECT REPORT

MicroVax 3400
TOPICS of 1ST of TWGDAM MEETING SERIES

• By Dec 1991 – 37 from 25 labs + Arty Eisenberg/NIST Dennis Reeder
  • DNA Training update
  • Interesting casework @ FBI, RCMP, CFS + 12+casework
  • RFLP Protocol issues – EtBR, Agarose, membranes, population studies, upper gel (?) studies, lab precision – NIST David Duewer
  • Model Audit Checklist

• Jan 1994 Jim Kearney steps down as SWGDAM Chair, Bruce Budowle takes over
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Either

FBI agents are a good sample of the
can population or they are more likely
to be named in paternity disputes.

Genetics 48: 662-676 (91) Est Allele Freq VNTR Loci
NIST INVOLVEMENT IN DNA IMPLEMENTATION – DNA SRM

- Dr. Dennis Reeder
  Original NIST representative/guide

- Dr. David Lee Duewer
  Statistics & Experimental Design

- Dr. Mike Coble
  Mt DNA & Probabilistic Genotyping

- Dr. John Butler
  Prev. NIST representative teacher/mentor & PCR SRM

- Margaret Kline
  SRM Development
  Variant Alleles

- Dr. Peter Valone
  Multiplex PCR
  Rapid DNA Processing
  Current Program Head & NIST Representative
After NIST SRM & QAS established by FBI through SWGDAM & DNA Advisory Board (Grandfathered Period)

*From numerous NIST Presentations by Dr. John Butler*
FBI CODIS UNIT – INFLUENCE ON QAS/AUDITS

1st CODIS Unit Chief
Dr. Thomas Callahan
National CODIS Administrator

“Some people think of the QAS & NDIS Procedures as road maps to possibilities....”

Add ‘I Reviews of QAS Audits & CODIS Audits Required for NDIS by DOJ OIG

Dr. Douglas Hares
NDIS Custodian
Full QAS implementation

Add ‘l Reviews of QAS Audits & CODIS Audits Required for NDIS by DOJ OIG

*From numerous NIST Presentations by Dr. John Butler
Time to review and Revise QAS?

Challenge a little too large?

Remember that you stand on the shoulders of past TWGDAM & SWGDAM members
Revisions to the QAS
Past Experience

Rule of unintended consequences

- Resolving a problem for a situation that a small minority abuse may cause many unintended consequences
- Use of blanks and complications that ensue when insufficient blank remains (after the grandfathered extractions)
- Complications of team processing – esp. proficiency testing
Expecting this outcome?
OTHER TOPICS & THANKS

• Thanks to the FBI, TWGDAM and SWGDAM members, and Tony for allowing me to give you the “benefit” of my experience today and for the opportunities they provided for me (going back to 1974) and the programs I was involved with to grow and prosper.
Always end with puppy/pet pictures – you get fewer nasty questions after they see puppies!