

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)

Genetic Markers in Use Over 50 Years

1963 (BK)	1973 (AK)	1983	1993	2003	2013+ (PK)
ABO	ABO	PGM/PGM sub	DNA RFLP	Core STRs	Expd Core STRs
	PGM	ADA	Dqa/PM	Y STRs	Core? Y STRs
	ADA	AK	D1S80	mtDNA	mtDNA/NG Seq
	AK	6PGD	PGM/PGM sub		X STRs?
	6PGD	G6PD	ADA		SNPs+++
	G6PD	Hp	AK		Arrays/WG Seq
	Hp	EAP	6PGD		
	MN	GLOI	G6PD		
	Rh	EsD	Hp		
		Gc	EAP		
		PepA	GLOI		
		CAII	EsD		
		ABO	Gc/Gc subtype		
		Gm	PepA		
		Tf	CAII		
			ABO		
			KM		
			AM		

*After Brian Wraxall's CAC Founder's Lecture 1993

TWGDAM & SWGDAM EXPERIENCE

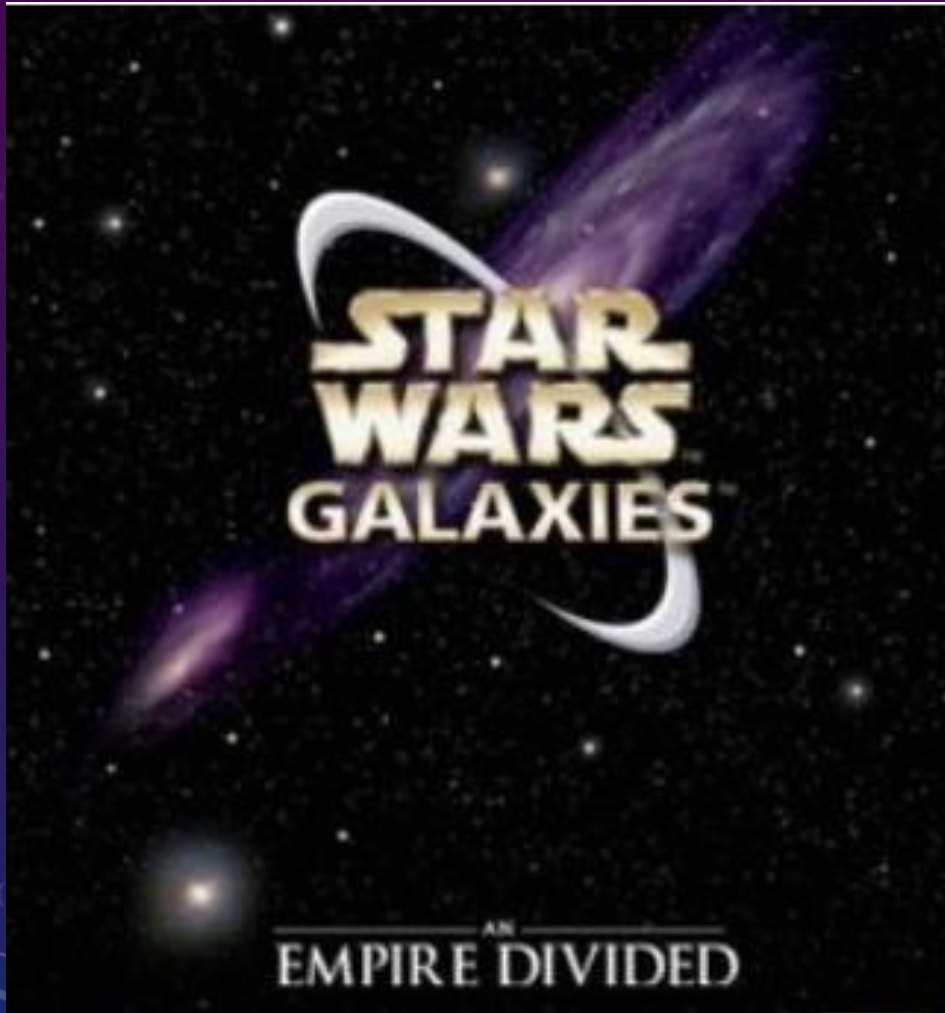
Interesting Historical Observation —

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?

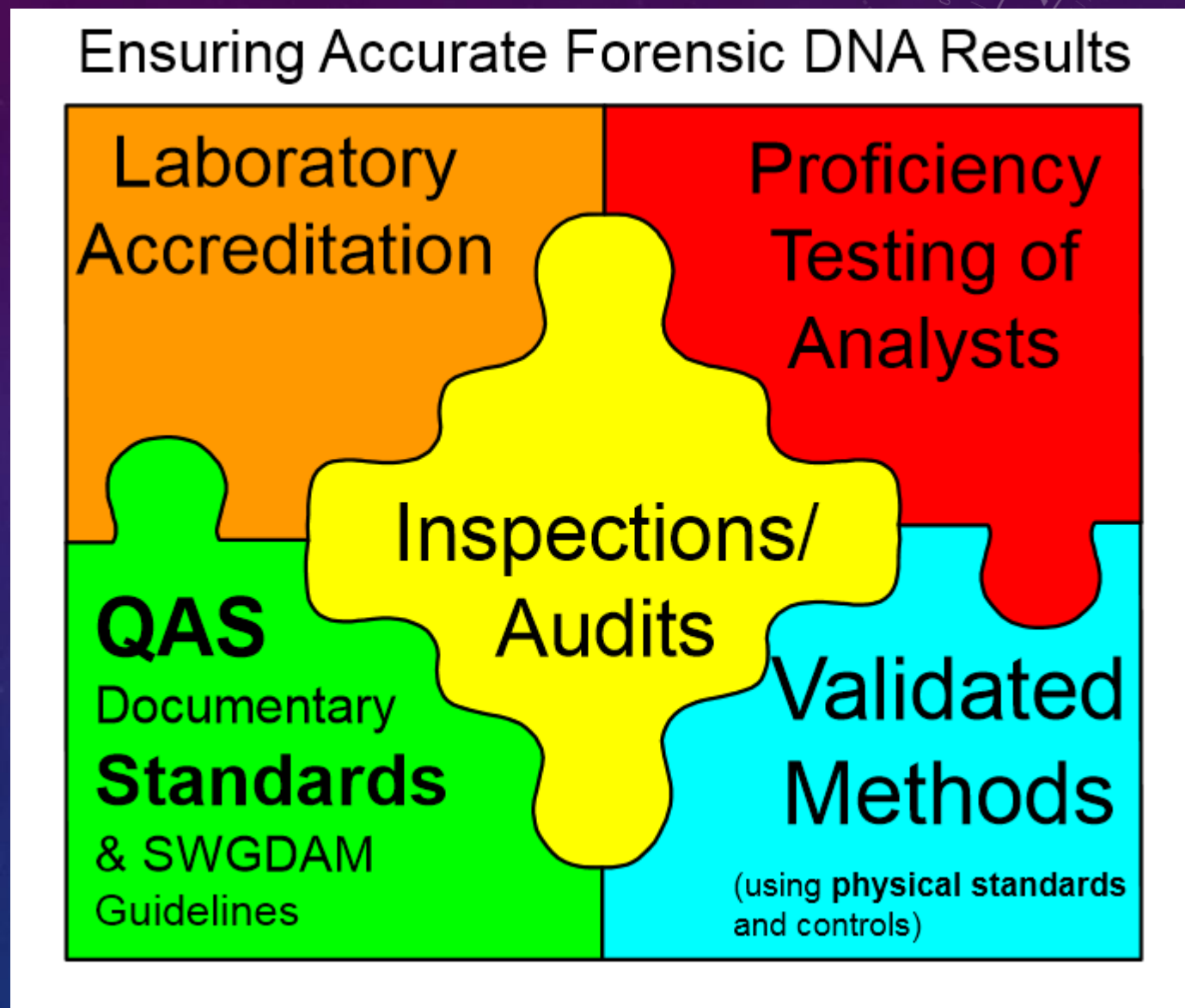
The New SWG



The 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

Per Peterson, J and Leggett, A (2007) THE EVOLUTION OF FORENSIC SCIENCE: PROGRESS AMID THE PITFALLS

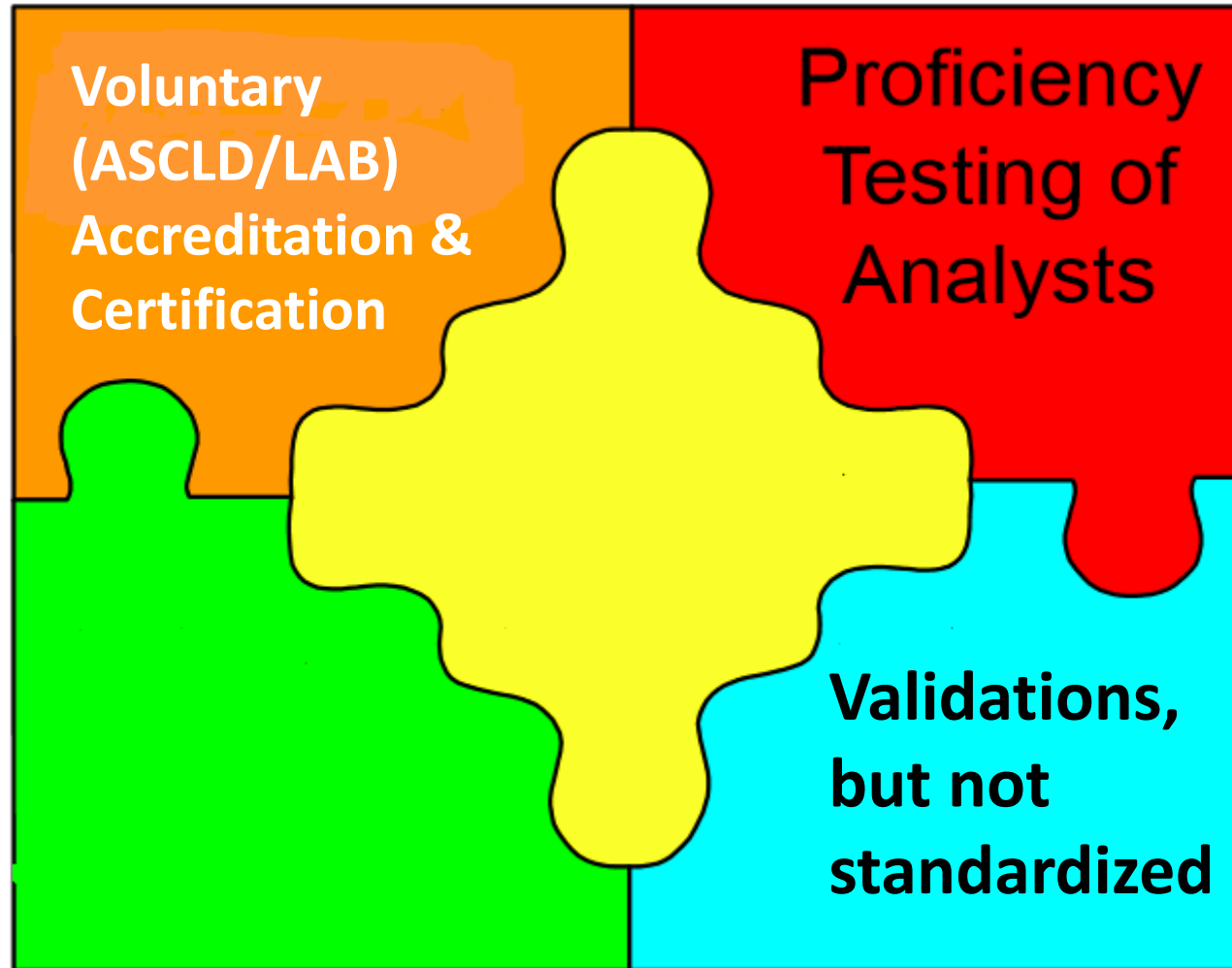
<http://www.stetson.edu/law/lawreview/media/the-evolution-of-forensic-science-progress-amid-the-pitfalls.pdf>

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

General
Situation
in late 70's
& 1980's

Ensuring Accurate Forensic DNA Results



Proficiency
Testing often
informal- with
no outside
review

BACKGROUND – FORENSIC SCIENCE

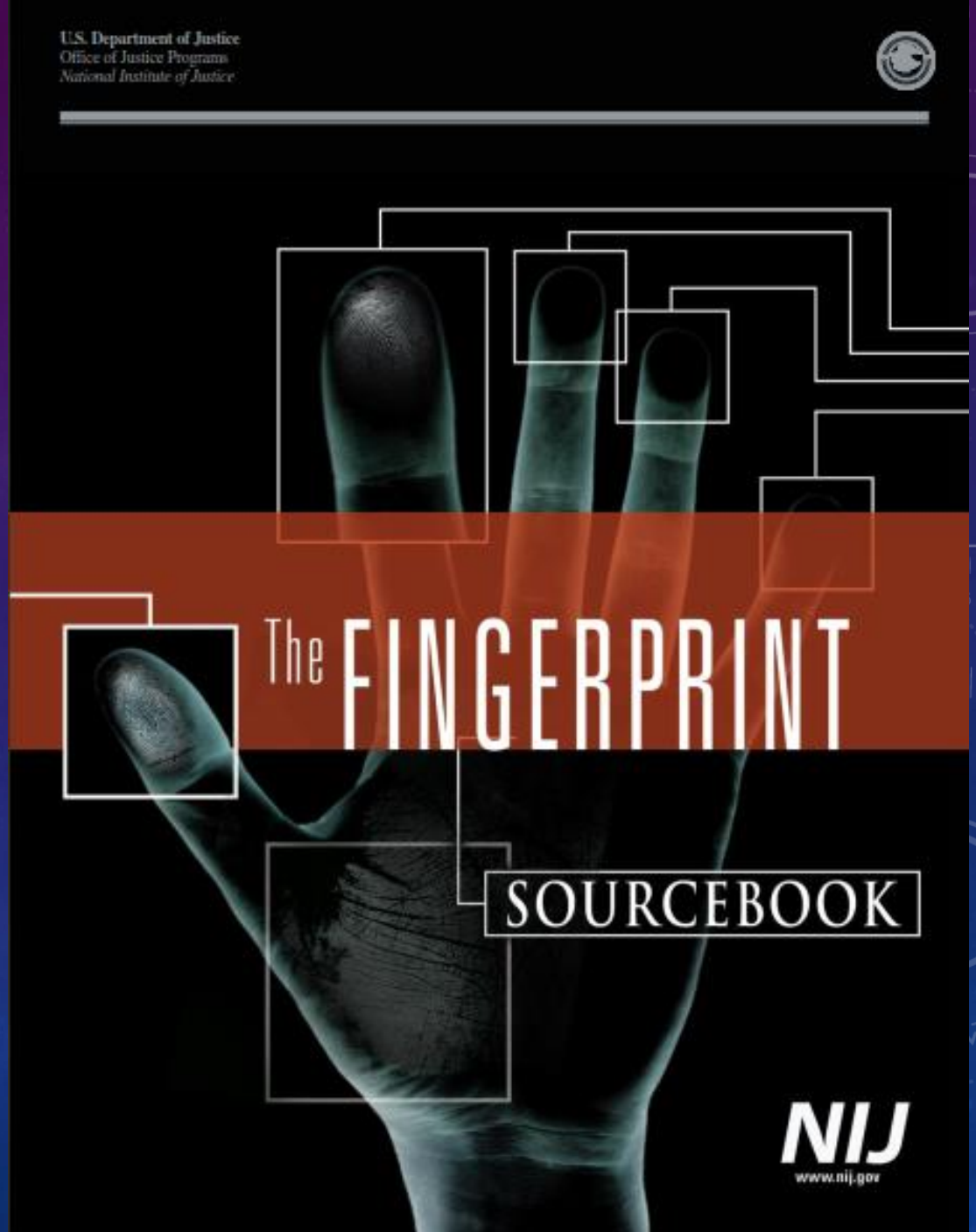
INTER-LABORATORY COMPARISONS in 1970-80s

- 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

[https://
www.ncjrs.gov/
pdffiles1/nij/
225320.pdf](https://www.ncjrs.gov/pdffiles1/nij/225320.pdf)

Esp. Chapter 6



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

CAC NEWSLETTER

RE: 1987 FORENSIC SEROLOGY SYMPOSIUM

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 pay-

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)
- 1984 – Dr. Alec Jeffreys - multi-locus probes for human identification
"The Blooding" 1986-1987 Manchester rape/murder
- 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**

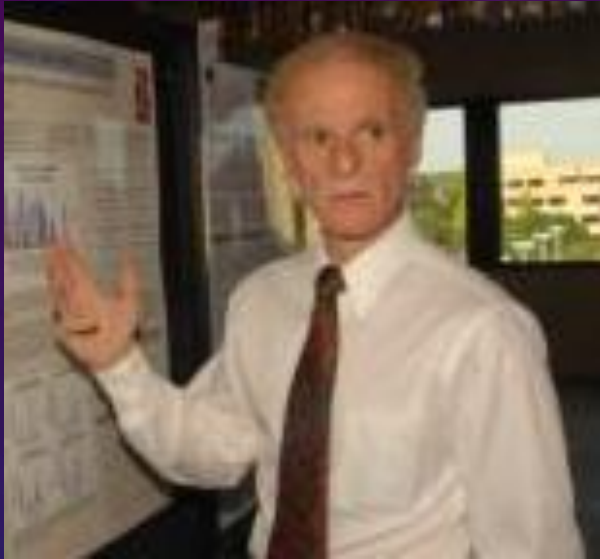


Technical Working Group on DNA Analysis Methods

Dr. James Mudd
Research
FSRTC & FBI QA
Unit
retired

- 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 Wayne
(former RCMP-now
McMasters Univ.)



Dr. Ron Fournier
RCMP
Now National Dir
Services & Research

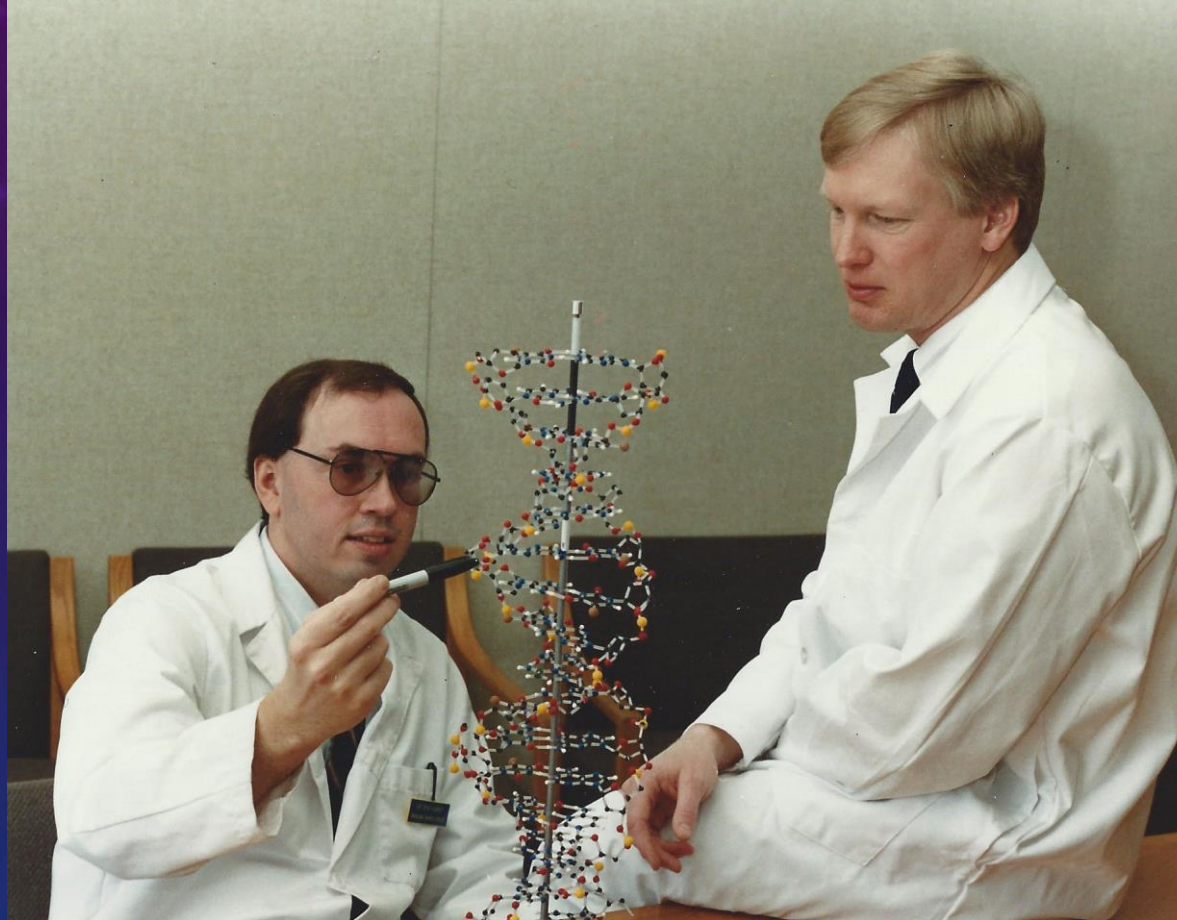
Dr. Pam Newall
Former DNA Lab
Dir. Center of
Forensic Services,
Toronto—
retired/consulting

?

SOME SCIENTISTS & PERSONALITIES W/MAJOR IMPACT (IN EARLY YEARS)



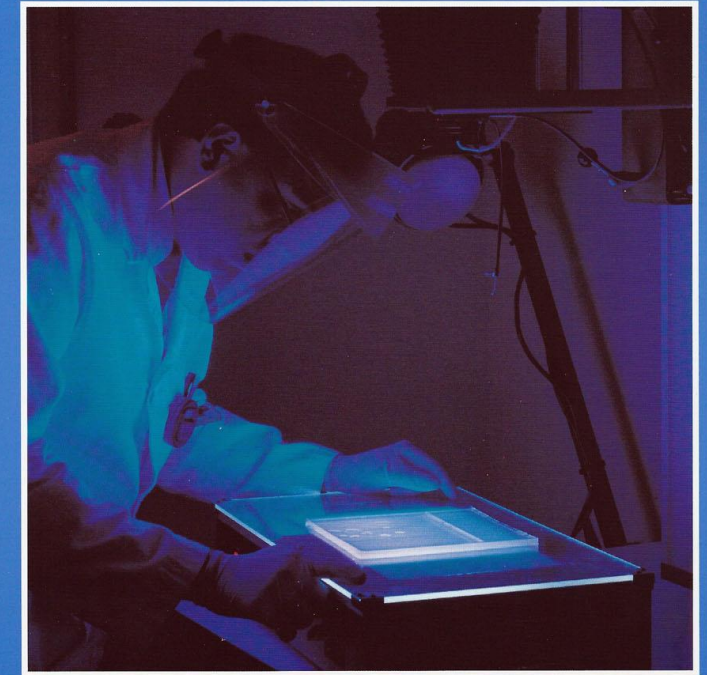
Dr. Ron Fourney
RCMP (2011)
Now National Dir
Services & Research



Dr. Ron Fourney with Dr. John Bowen



ROYAL CANADIAN MOUNTED POLICE
GAZETTE



VOL. 52, No. 4, 1990

Canada

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

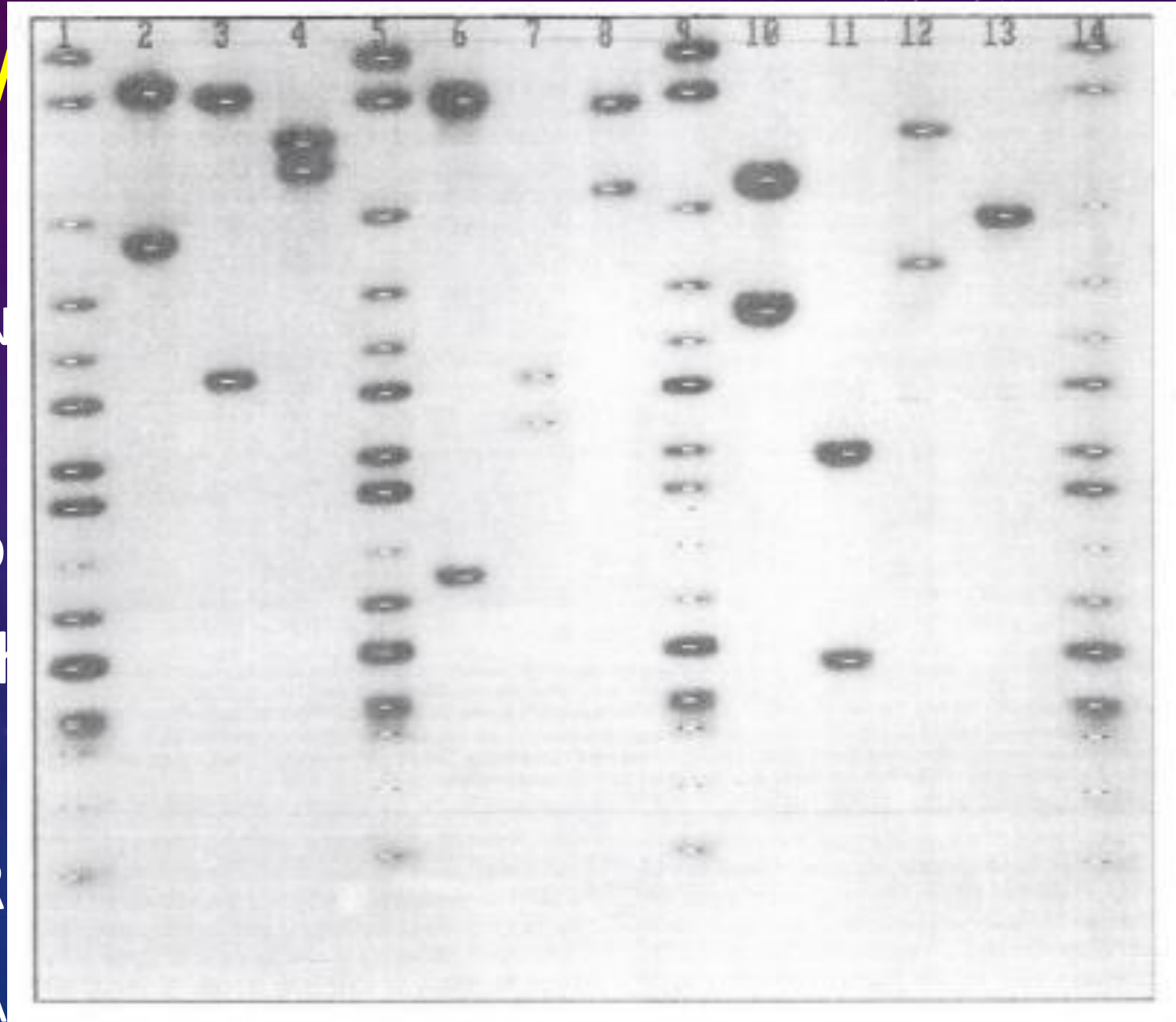
- Dr. Dwight Adams – RFLP environmental insult/CW
- Dr. F. Sam Baechtel – DNA extraction methods
- Dr. Catherine (Cate) Comey – “tracking status of PCR”
- Dr. Harold (Hal) Deadman - hair extraction/DNA quantitation/CW
- Dr. Keith Monson – IT/Image analysis – “PC God”
- Dr. James Mudd - QA
- Dr. Randy 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

TOPICS of 1ST of TW

- Feb 1989 - 27 from 16
(essentially same topics in N
- Lab validation & pre
- RFLP methods in wo
- DNA Extraction meth
- Status PCR
- Population dbases R
- Demo of “PC God” A

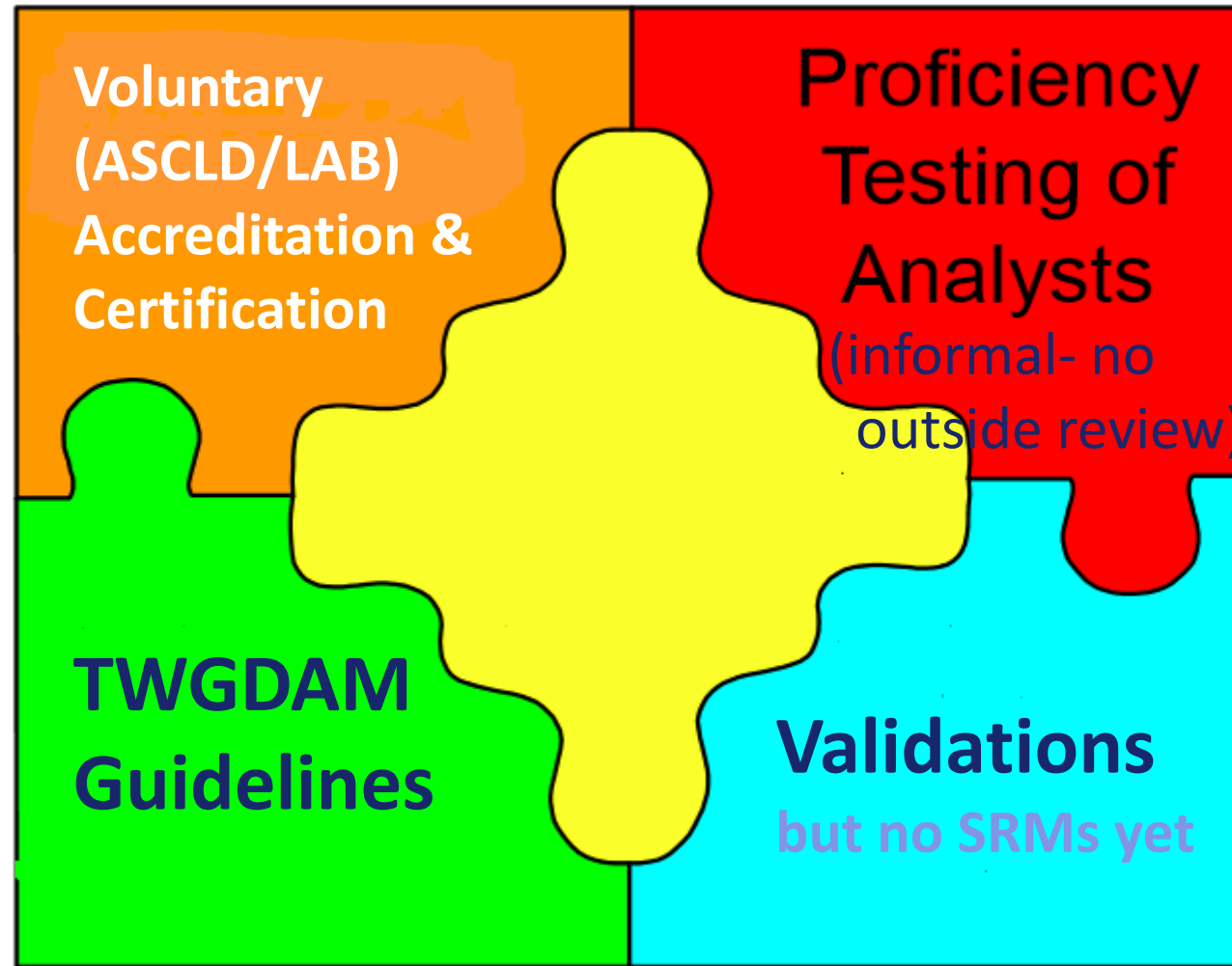


TOPICS of 1ST of TWGDAM MEETING SERIES

- 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

Situation
After
TWGDAM
Guidelines
1989-
1992

Ensuring Accurate Forensic DNA Results



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

MicroVax 3400

TOPICS of 1ST of TWGDAM MEETING SERIES

A NATIONAL DNA PROFILE DATABASE SYSTEM (NOPDS)
(A Theoretical Model)

Prepared by
The Technical Working Group on
DNA Analysis Methods

DRAFT

May 30, 1989

MicroVax 3400

JULY '91 TWGDAM AND DBASE PILOT PROJECT REPORT

FBI

Add RFLP Image Reading

FBI RFLP Analysis

File Edit Design Utilities Commands Help

Autorad Reading Results

which of soils

Autorad Reading by on

Originating Laboratory Membrane Id

Probe

Lane Num	Contents	1	2	3	4	5	6
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Band Number

Comments *field*

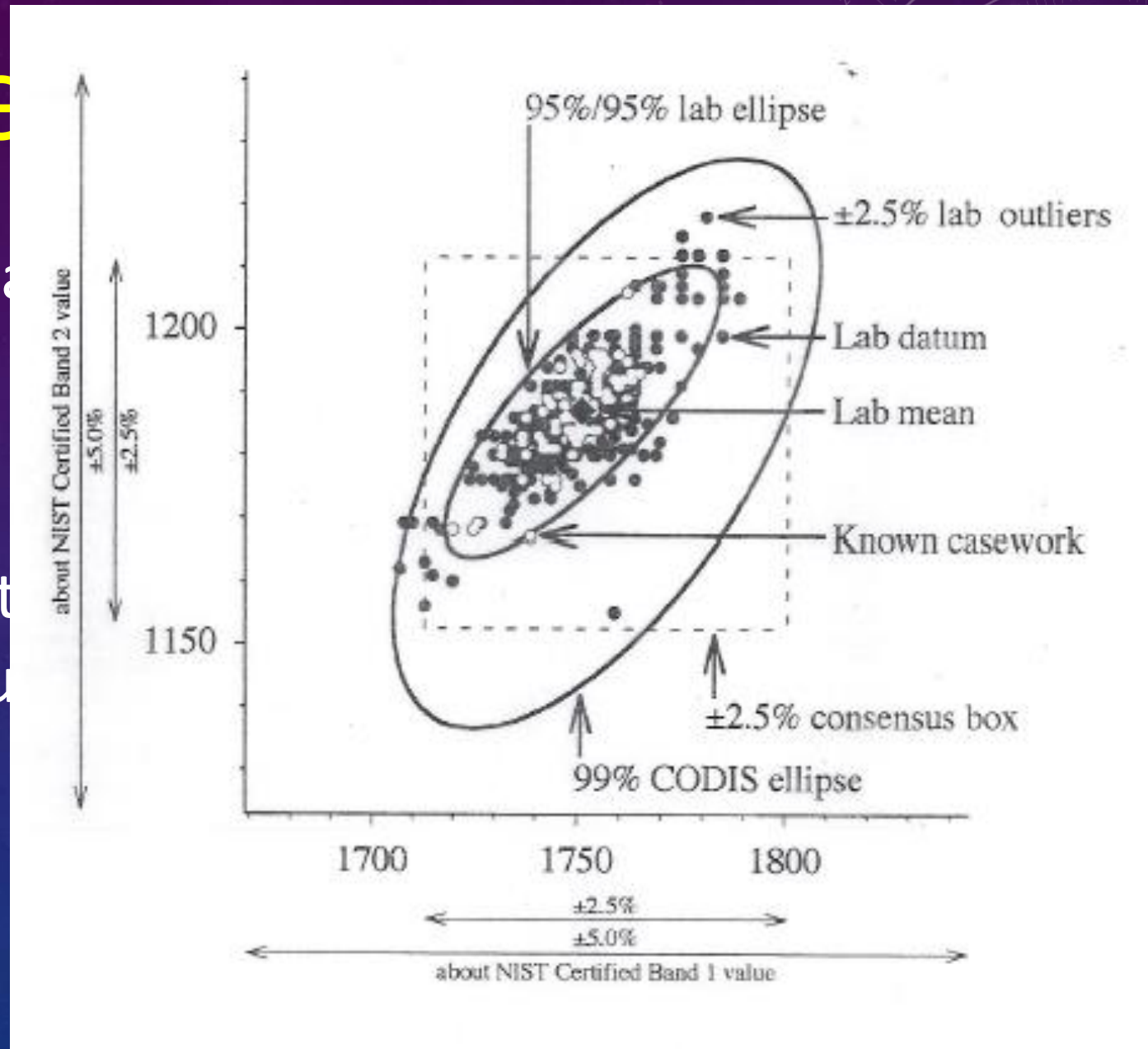
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TOPICS of 1ST of TWGDAM MEETING SERIES

- 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

TOPICS of 1ST of TWG

- By Dec 1991 – 37 from 25 labs
 - DNA Training update
 - Interesting casework @
 - RFLP Protocol issues – Et studies, upper gel (?) stu
 - Model Audit Checklist
- Jan 1994 Jim Kearney
Bruce Budowle takes over



TOPICS of 1ST of TWGDAM MEETING SERIES

- Jul 1992 notes – Devlin, Risch, & Roeder (1991)

Devlin "Practical (FBI) vs Eggheaded"
but States believes data show (DRR)
"Reasonableness of (FBI)
Approach"
I Devlin, Risch & Roeder
Genetics 48: 662-676 (91) Est Allele Freq
VNTR Loci

TOPICS of 1ST of TWGDAM MEETING SERIES

- Jul 1992 notes – Devlin, Risch, & Roeder (1991)

Either

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

Devlin, Risch & Roeder

Genetics 48 : 662-676 (91) Est Allele Freq
VNTR Loci

NIST INVOLVEMENT IN DNA IMPLEMENTATION – DNA SRM



Dr. John Butler

Prev. NIST representative
teacher/mentor & PCR SRM



Dr. Mike Coble
Mt DNA &
Probabilistic
Genotyping



Dr. David Lee Duewer
Statistics &
Experimental Design

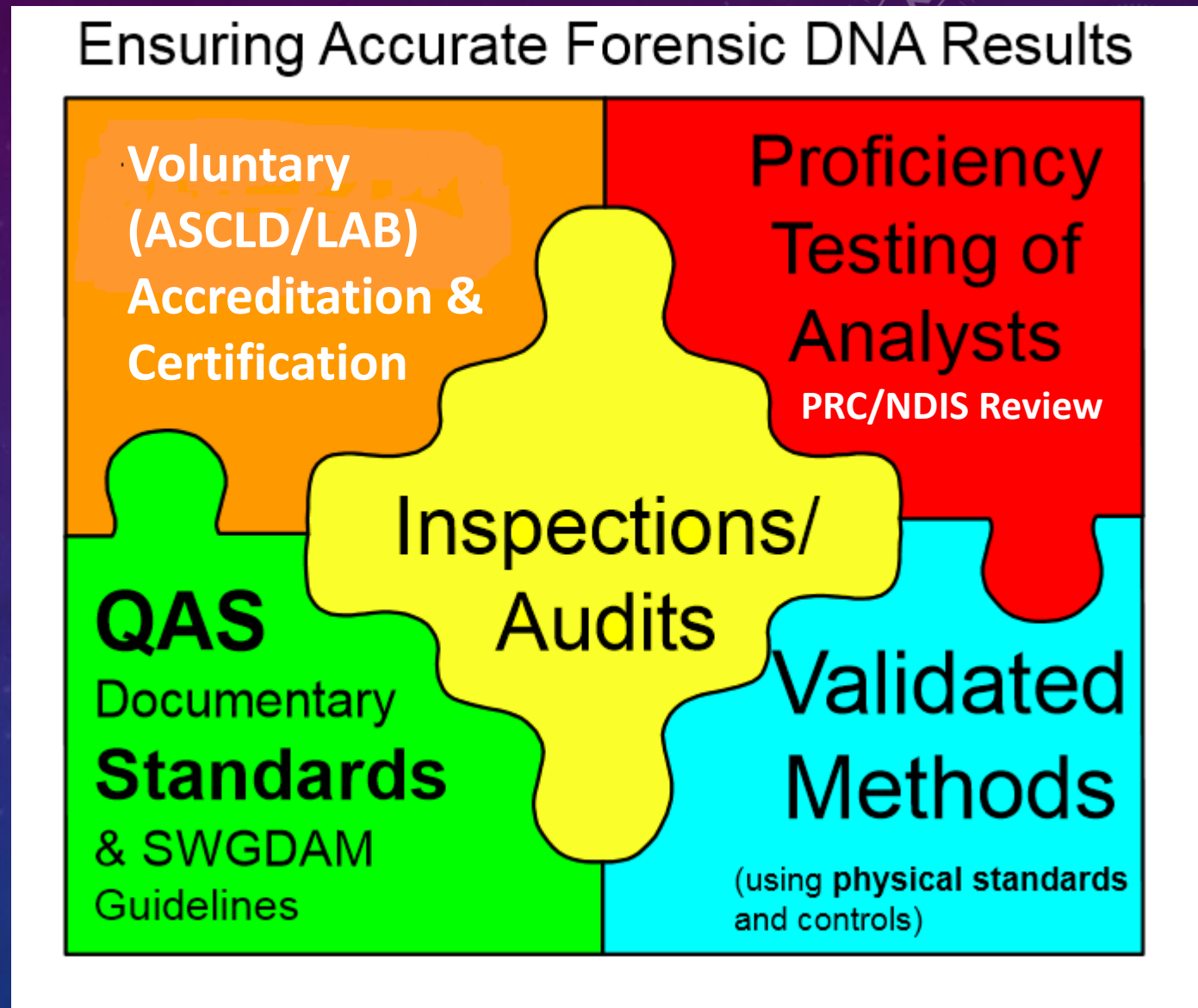


Margaret Kline
SRM Development
Variant Alleles



Dr. Peter Valone
Multiplex PCR
Rapid DNA Processing
Current Program Head &
NIST Representative

After NIST SRM
& QAS
established by
FBI through
SWGDM & DNA
Advisory Board
(Grandfathered Period)



*From numerous NIST Presentations by Dr. John Butler

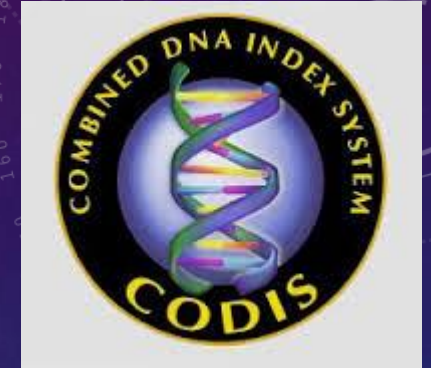
FBI CODIS UNIT – INFLUENCE ON QAS/AUDITS



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

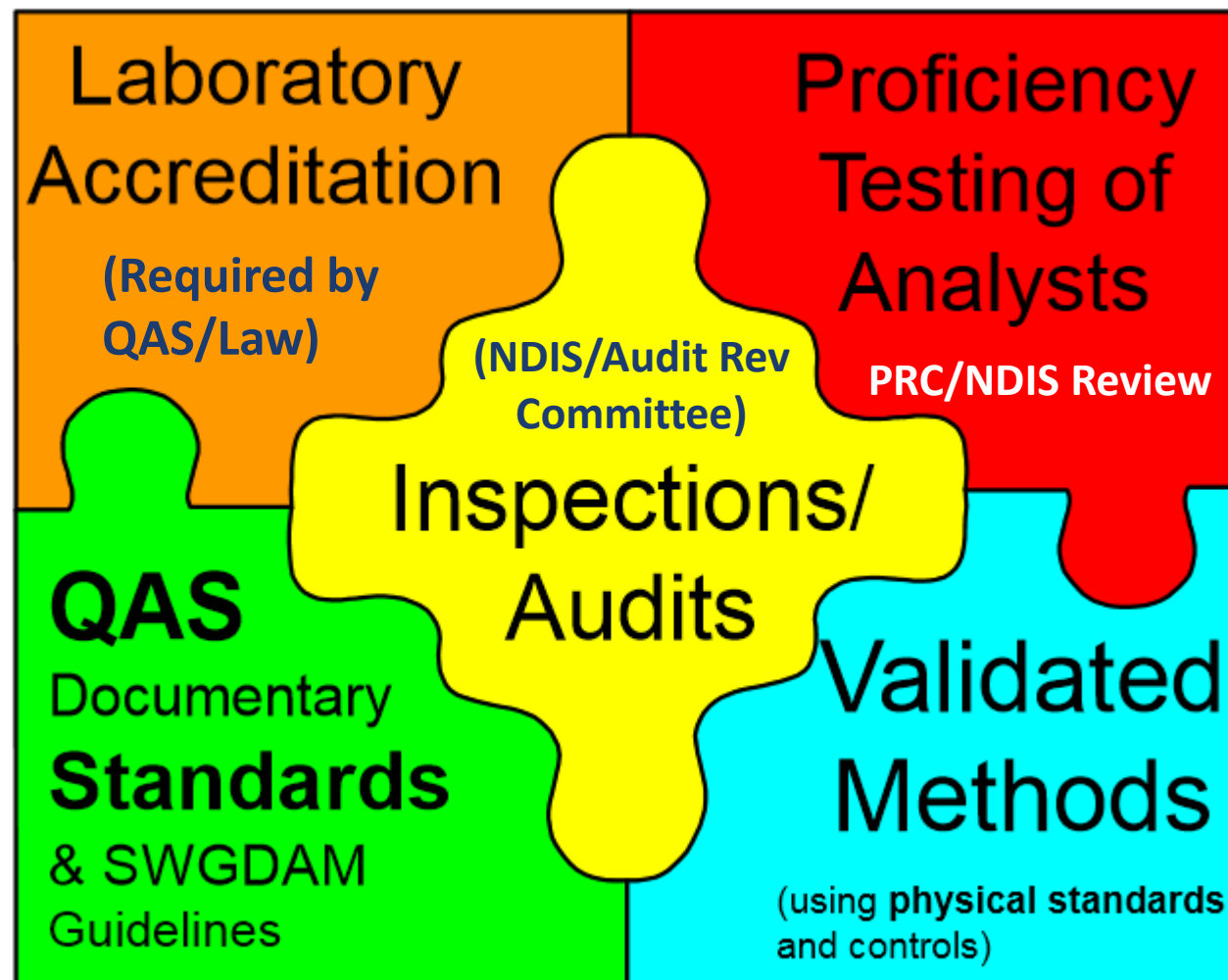


Dr. Douglas
Hares
NDIS
Custodian

Full QAS implementation

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

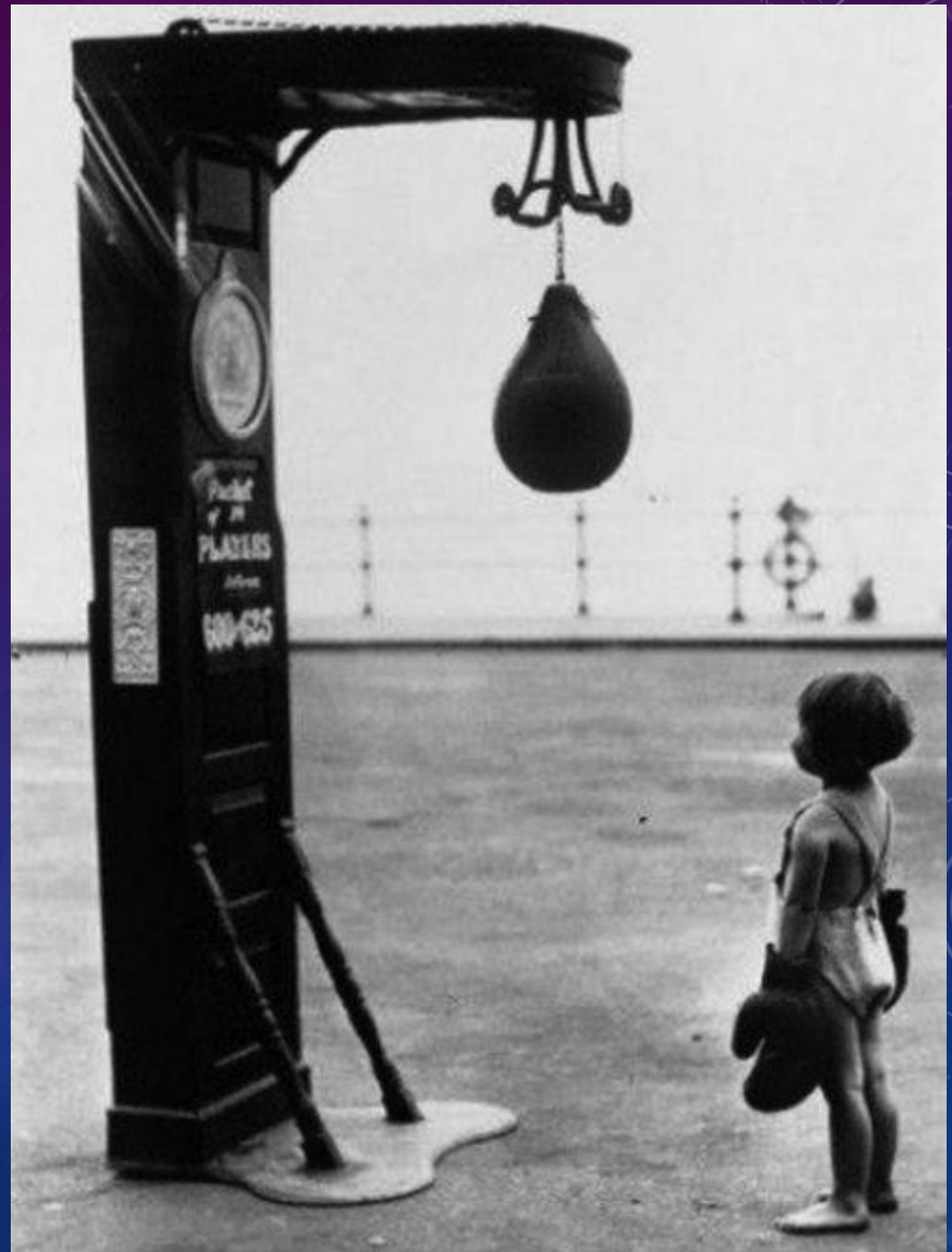
Ensuring Accurate Forensic DNA Results



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!

