

Topics and Techniques for Forensic DNA Analysis
Continuing Education Seminar

Introductions

NYC OCME
Dept of Forensic
Biology

New York City, NY
April 18, 2012



Dr. John M. Butler &
Dr. Michael D. Coble
National Institute of
Standards and Technology

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Outline for Today's Training

- Introductions
- Data Interpretation and Statistical Analysis (*John*)

BREAK

- Mixture Interpretation (*Mike*)

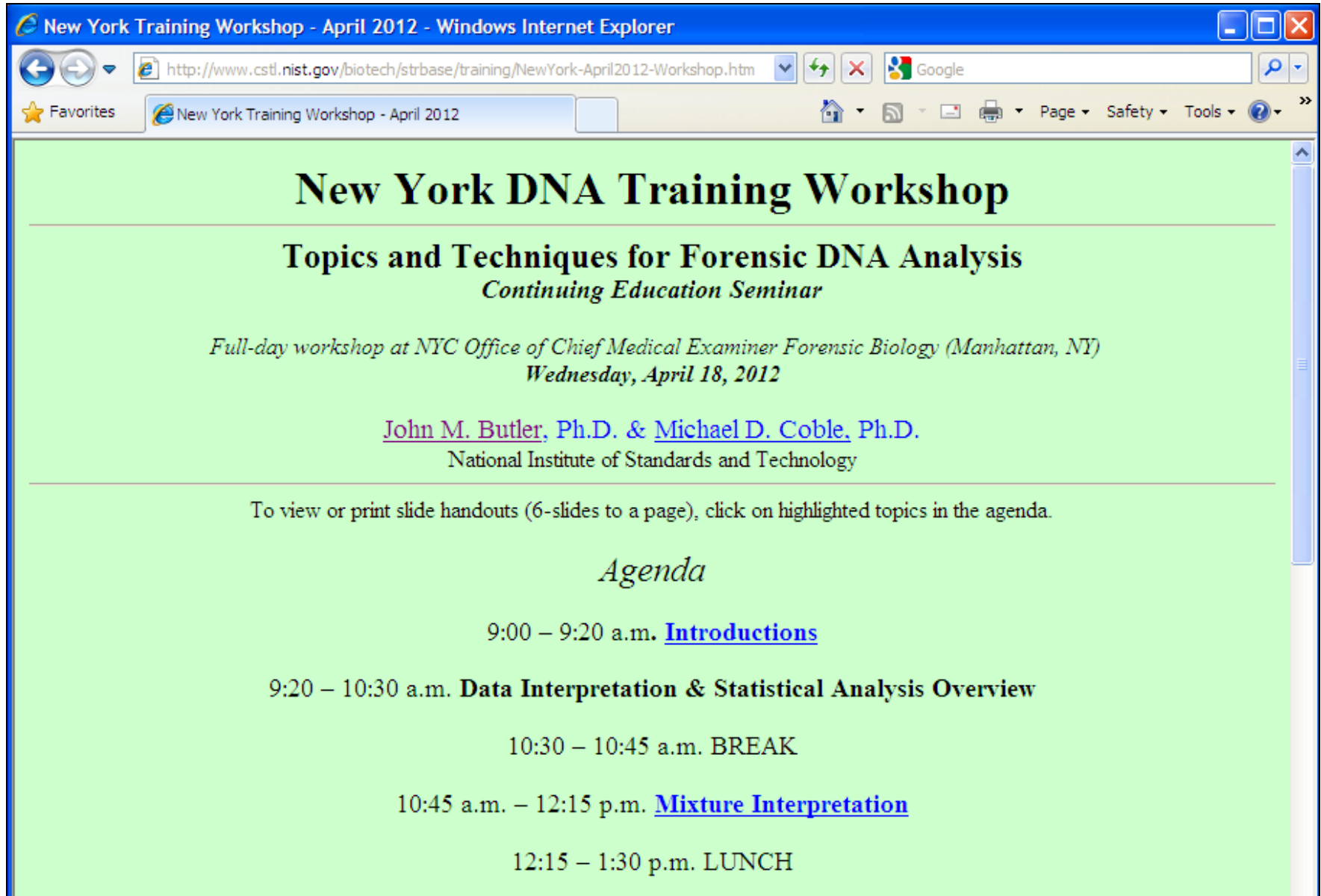
LUNCH BREAK

- STR Markers & CE Instrumentation (*John*)

BREAK

- Y-STRs, mtDNA, and the Romanov Case (*Mike*)

These slides are all available on STRBase...



The screenshot shows a Windows Internet Explorer browser window. The title bar reads "New York Training Workshop - April 2012 - Windows Internet Explorer". The address bar contains the URL "http://www.cstl.nist.gov/biotech/strbase/training/NewYork-April2012-Workshop.htm". The page content is as follows:

New York DNA Training Workshop

Topics and Techniques for Forensic DNA Analysis

Continuing Education Seminar

*Full-day workshop at NYC Office of Chief Medical Examiner Forensic Biology (Manhattan, NY)
Wednesday, April 18, 2012*

[John M. Butler, Ph.D.](#) & [Michael D. Coble, Ph.D.](#)
National Institute of Standards and Technology

To view or print slide handouts (6-slides to a page), click on highlighted topics in the agenda.

Agenda

9:00 – 9:20 a.m. [Introductions](#)

9:20 – 10:30 a.m. **Data Interpretation & Statistical Analysis Overview**

10:30 – 10:45 a.m. BREAK

10:45 a.m. – 12:15 p.m. [Mixture Interpretation](#)

12:15 – 1:30 p.m. LUNCH

<http://www.cstl.nist.gov/biotech/strbase/training/NewYork-April2012-Workshop.htm>


Two Formats for Download

Full slides (for iPad viewing)

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New York City, NY
April 18, 2012

**Dr. John M. Butler &
Dr. Michael D. Coble**
National Institute of
Standards and Technology



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Handouts (for printing)

NYC OCME Forensic Biology Continuing Education April 18, 2012

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Outline for Today's Training

- Introductions
- Data Interpretation and Statistical Analysis (John)

ISSAX


- Mitochondrial Interpretation (Mike)

LUCH-MIRAX

- DTR Markers & CE Instrumentation (John)

ISSAX

- Y-STRs, mtDNA, and the Romance Case (Mike)



Dr. John M. Butler
<http://www.cstf.nist.gov/tech/stbase/training.htm>


Education


- University of Virginia/PI Laboratory (1985-1987)
- Work performed at Biotech Center lab
- NIST APAC Position (1987-1987)
- GeneTrack Systems, Inc. (1987-1988)
- NIST Human Identity Project Leader (1988-present)

Ph.D. dissertation (Aug 1982): "Using and quantification of progressive chain reaction products by capillary electrophoresis for use in DNA typing"

Forensic DNA typing textbook (now in its 2nd edition)

- STRbase website: <http://www.cstf.nist.gov/tech/stbase/>
- Family with Terence and 3 children
- Hobbies: reading, editing, and making PowerPoint slides






Dr. Michael D. Coble
<http://www.cstf.nist.gov/tech/stbase/training.htm>

Education

- George Washington University/PCD, (1980-2000)
- Work performed with Tom Perone
- NIST NRC Position (2004-2008)
- AFCEA Research Section Chief (2008-2010)
- NIST Applied Genetics Group (2010-present)

Ph.D. dissertation (Aug 2004): "The Identification of Single Nucleotide Polymorphisms in the Y-chromosome: Genome to Increase the Power of Discrimination of Common Y-MINOs Type in the Caucasian Population"


- Family with Robert and 3 children
- Hobbies: Fantasy Baseball and Football (semi active)




NIST History and Mission

- National Institute of Standards and Technology (NIST) was created in 1901 as the National Bureau of Standards (NBS). The name was changed to NIST in 1988.
- NIST is a non-regulatory agency within the U.S. Department of Commerce and is devoted to service and provide measurement, standards, and technology to enhance the economy, protect lives, and improve the quality of life.
- NIST supplies over 1,300 Standard Reference Materials (SRMs) for food, agriculture, and government use in calibration of measurements.

NIST defines time for the U.S.

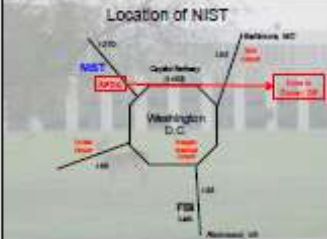


Time for a job



DNA typing standard

Location of NIST



Map showing NIST location in Washington, D.C., near the Capitol and FBI Lab.

<http://www.cstf.nist.gov/tech/stbase/training.htm> 1



Dr. John M. Butler

<http://www.cstl.nist.gov/biotech/strbase/butler.htm>

Experience

- University of Virginia/FBI Laboratory (1992-1995)
 - Work performed in Bruce McCord's lab
- NIST NRC Postdoc (1995-1997)
- GeneTrace Systems Inc (1997-1999)
- NIST Human Identity Project Leader (1999-present)

- Ph.D. dissertation (Aug 1995): "Sizing and quantitation of polymerase chain reaction products by capillary electrophoresis for use in DNA typing"
- *Forensic DNA Typing* textbook (now in its 2nd Edition)
- STRBase website: <http://www.cstl.nist.gov/biotech/strbase/>
- Family: wife Terilynne and 6 children
- Hobbies: reading, writing, and making PowerPoint slides

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Dr. Michael D. Coble

http://www.nist.gov/mml/biochemical/genetics/michael_d_coble.cfm

Experience

- George Washington University/AFDIL (1996-2004)
 - Work performed with Tom Parsons
- NIST NRC Postdoc (2004-2006)
- AFDIL Research Section Chief (2006-2010)
- NIST Applied Genetics Group (2010-present)

- Ph.D. dissertation (Jan 2004): “The Identification of Single Nucleotide Polymorphisms in the Entire Mitochondrial Genome to Increase the Forensic Discrimination of Common HV1/HV2 Types in the Caucasian Population”
- Family: wife Karen and 3 children
- Hobbies: Fantasy baseball and football team owner

Contact Information
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301-975-4330



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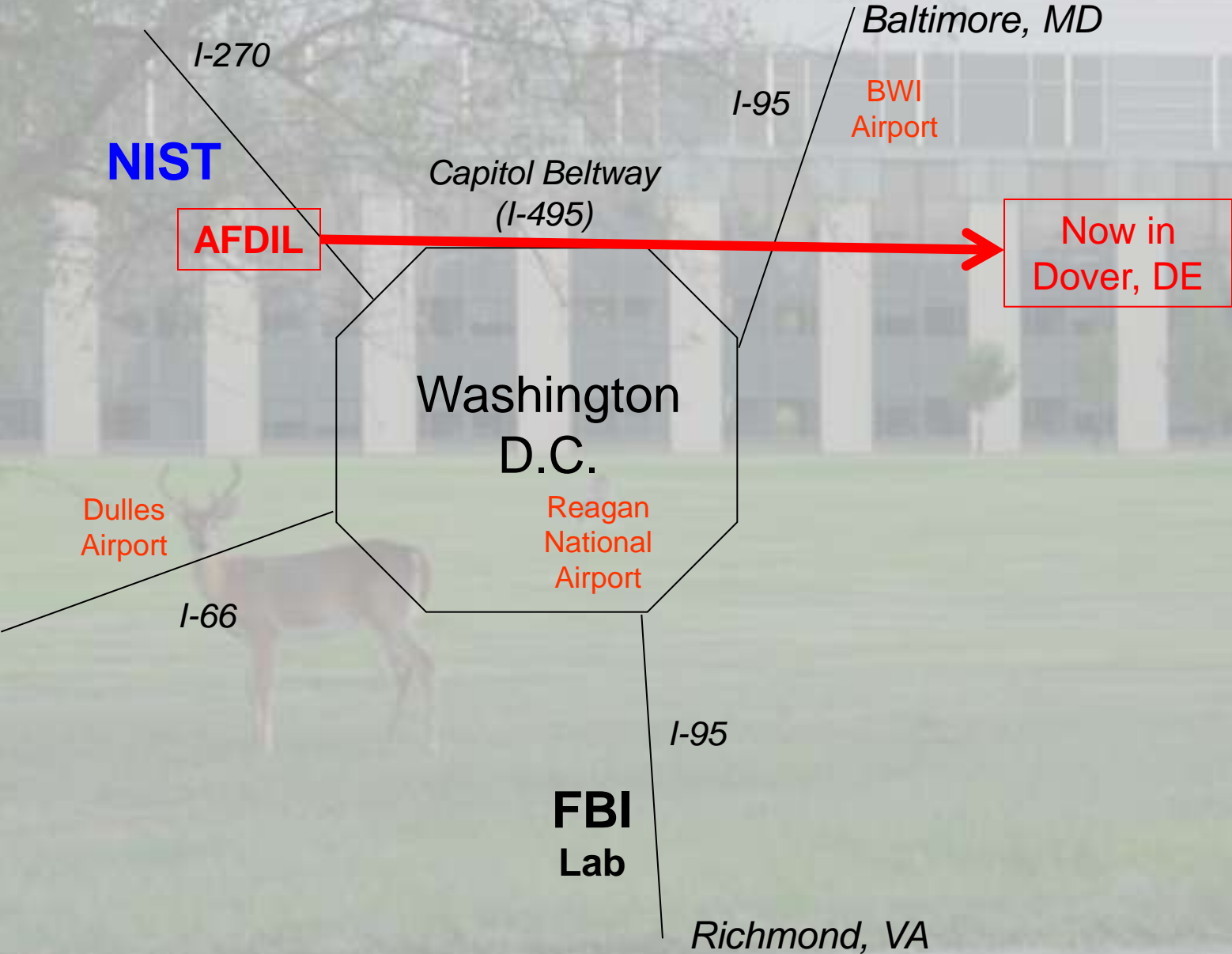


\$686 for 3 jars



DNA typing standard

Location of NIST



NIST Gaithersburg Campus

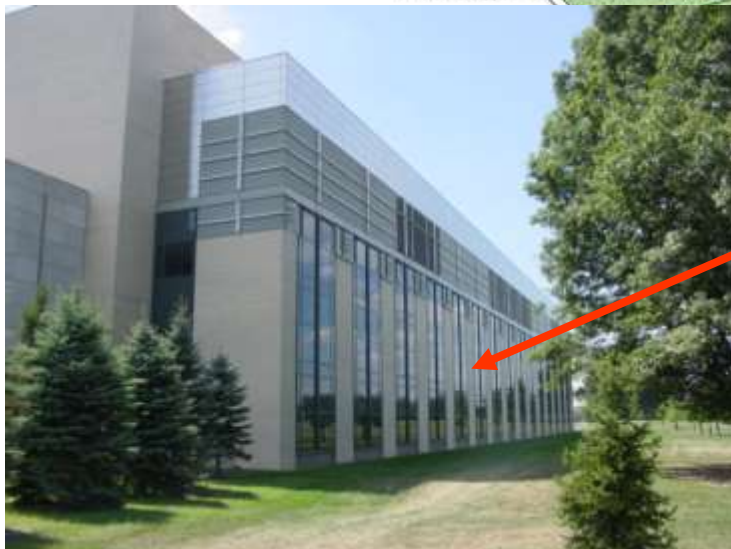
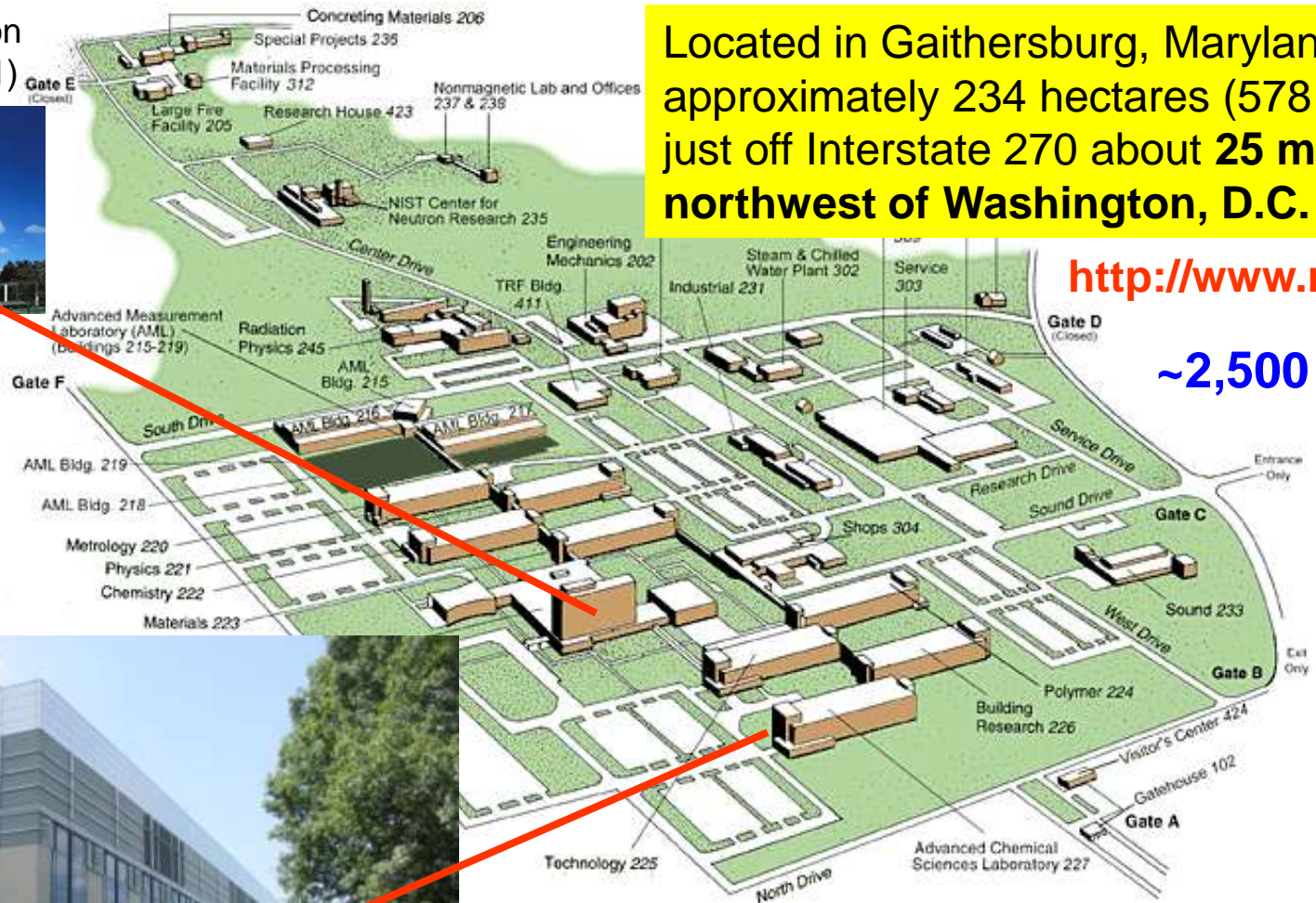
Administration
(Building 101)



Located in Gaithersburg, Maryland, on approximately 234 hectares (578 acres) just off Interstate 270 about **25 miles northwest of Washington, D.C.**

<http://www.nist.gov>

~2,500 staff



Advanced Chemical Sciences
Laboratory (Building 227)

Group Leader

NIST Applied Genetics Group



**John
Butler**



**Mike
Coble**



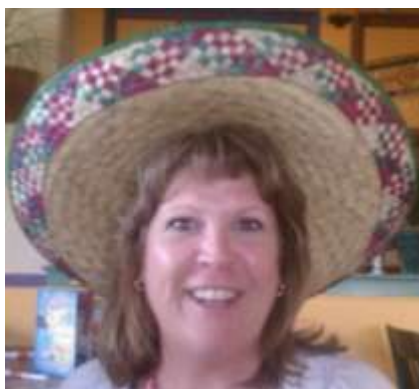
**Margaret
Kline**



**Marcia
Holden**



**Pete
Vallone**



Patti Rohmiller
Office Manager



**Becky
Hill**



**Ross
Haynes**



**Erica
Butts**



**Kevin
Kiesler**

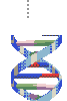


***Bringing calibration to clinical DNA diagnostics, speed to DNA testing,
and technology to the scales of justice***

APPLIED GENETICS Group

Major Programs Currently Underway

- **Forensic DNA**
 - STRBase website
 - New loci and assays (26plex)
 - **STR kit concordance & new autosomal STR loci**
 - Ancestry SNP assays
 - Low-template DNA studies
 - **Mixture interpretation research and training**
 - Variant allele cataloging and sequencing
 - ABI 3500 validation
 - Training workshops to forensic DNA laboratories
 - **Y-STR markers**
 - Validation experiments, information and software tools
 - **Textbooks – 3rd ed.** (3 volumes)
- **Clinical Genetics**
 - Huntington's Disease SRM
 - CMV SRM
 - Exploring future needs
- **Ag Biotech**
 - “universal” GMO detection/quantitation (35S promoter)
- **DNA Biometrics**
 - **Rapid PCR methods**
 - Efforts to standardize testing of future portable DNA systems
 - Kinship analysis
- **Cell Line Authentication**
 - ATCC documentary standard



NIST Human Identity Project Teams

within the Applied Genetics Group

Forensic DNA Team

Guest Researcher

DNA Biometrics Team

Funding from the **National Institute of Justice (NIJ)** through NIST Office of Law Enforcement Standards

Funding from the **FBI S&T Branch** through NIST Information Access Division



John Butler



Mike Coble



Becky Hill



Margaret Kline

STRBase, Workshops & Textbooks

Mixtures, mtDNA & Y

Concordance & LT-DNA

SRM work, variant alleles & Cell Line ID



Manuel Fondevila Alvarez

Data Analysis Support



Dave Duewer



Pete Vallone

Rapid PCR, Direct PCR & Biometrics



Erica Butts

ABI 3500 & DNA Extraction



Kevin Kiesler

PLEX-ID & NGS Exploration



Office Manager Patti Rohmiller



Forensic DNA Typing Textbook

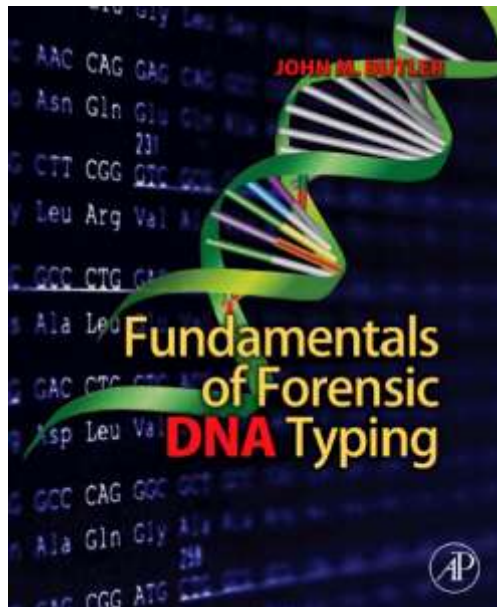
3rd Edition is Three Volumes

Now part of my job at NIST (no royalties are received)



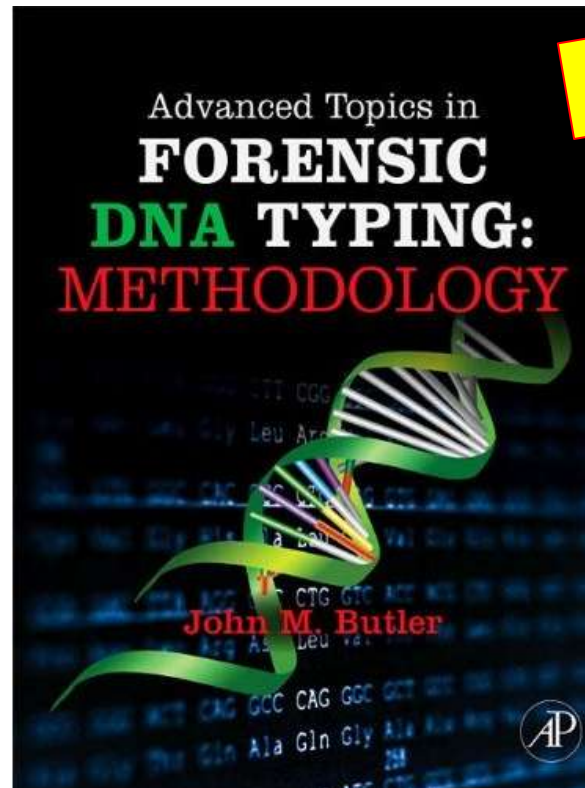
John Butler

*For beginning students,
general public, & lawyers*



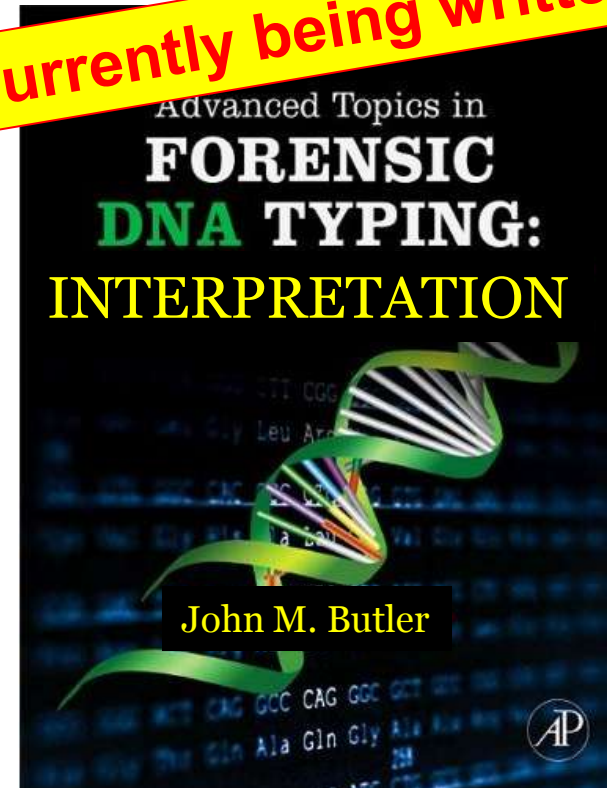
Sept 2009

~500 pages



August 2011

~700 pages



Fall 2012

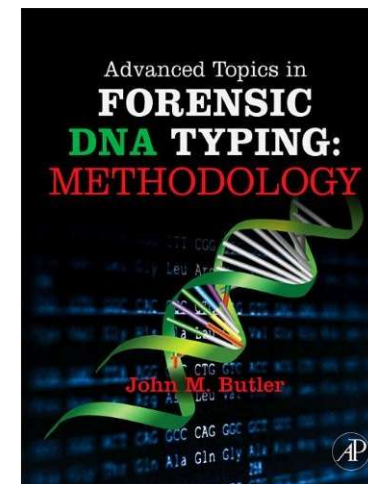
~500 pages

New Material in *Advanced Topics: Methodology*

Released August 2011

>50% new material from previous editions

- Cites >1500 new references (>2800 ref. total)
- **New chapter** on legal aspects (Ch. 18)
 - expert witness prep, perspectives from lawyers
 - App. 4 (interviews): experts, prosecutors, & defense
- **New chapter** on X-chromosome markers (Ch. 15)
- **Extensive updates** on CE (Ch. 6), validation (Ch. 7), database issues (Ch. 8), disaster victim identification (Ch. 9), miniSTRs (Ch. 10), LTDNA (Ch. 11), SNPs (Ch. 12), Y-STRs (Ch. 13), mtDNA (Ch. 14), non-human DNA (Ch. 16), and new technology (Ch. 17)
- Coverage of all the new STR kits (Ch. 5)
- Listing of all known STR alleles for all 23 kit loci (App. 1)
- Most detail to-date on the Grim Sleeper case (D.N.A. Box 8.5)



Clickers (Audience Response Systems)

- **Allow real-time audience participation**
- Responses are tied to your clicker – but no connection is made between the clicker and you – so **please provide your honest opinion** knowing that **you can respond anonymously**



Polling test for clickers:

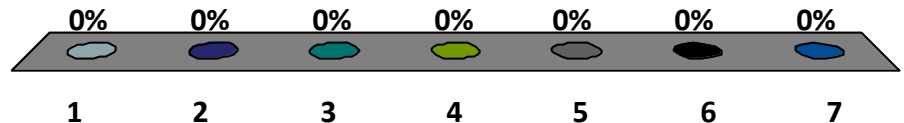
Have you participated in a presentation where clicker responses were gathered?

1. Yes
2. No

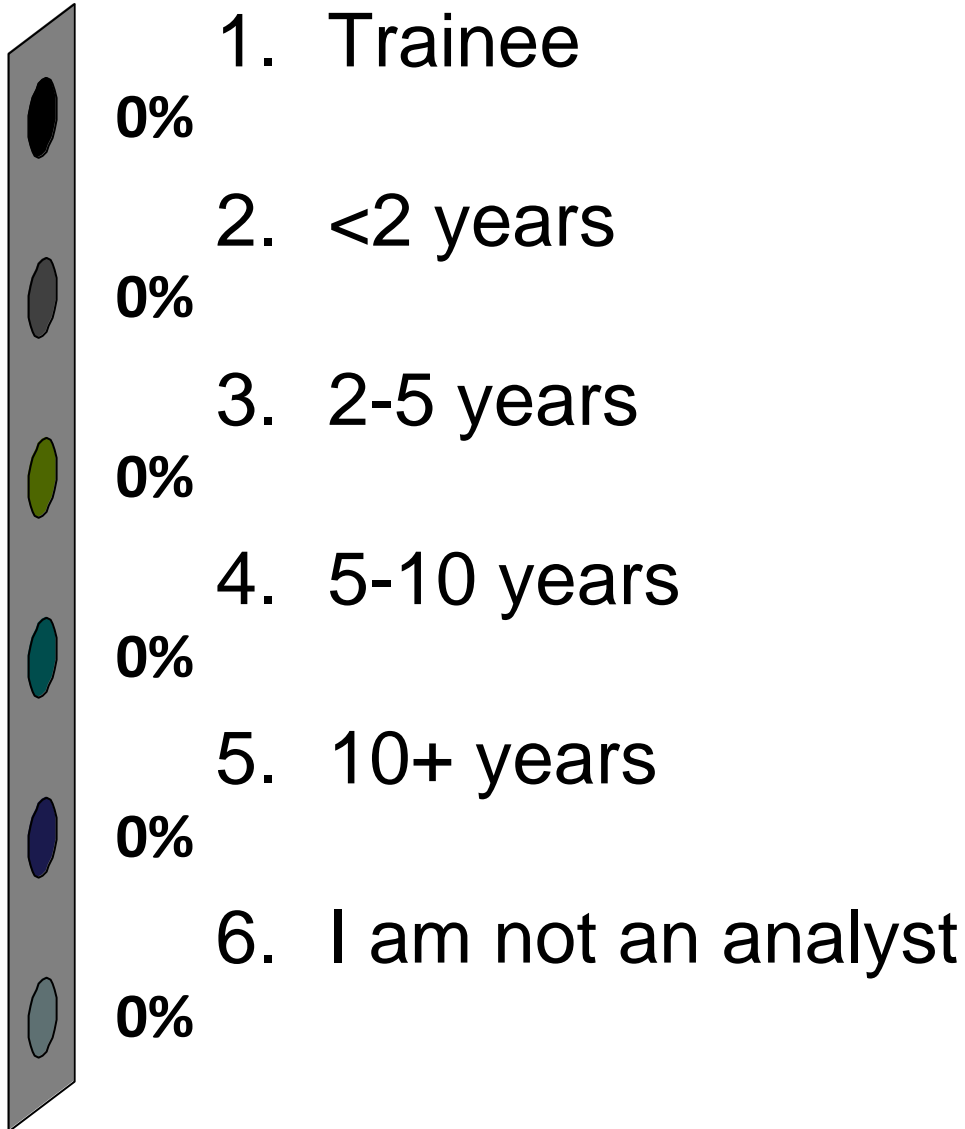


What is your role in the laboratory?

1. DNA analyst
2. DNA technician
3. Database analyst
4. DNA technical leader
5. QA Manager
6. Attorney
7. Other

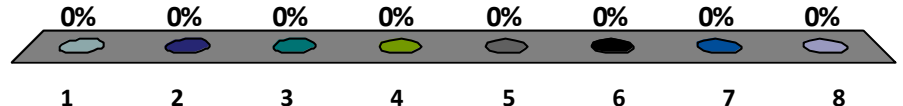


Your Experience Level as a DNA Analyst



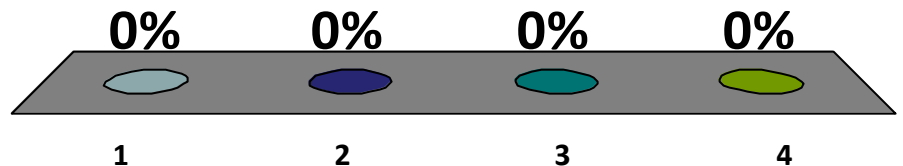
What laboratory are you from?

1. NYC OCME
2. NYSP Albany
3. Westchester Co.
4. Nassau County
5. Suffolk County
6. Monroe County
7. Onondaga County
8. New Jersey SP



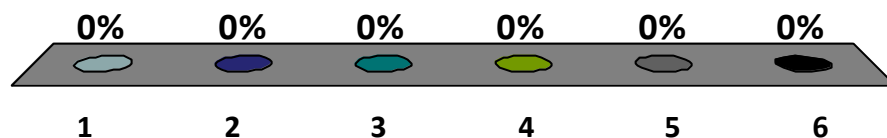
What topic are you most interested in today? (select only one)

1. Interpretation & statistics overview
2. Mixture interpretation
3. STRs & CE
4. Y-STRs, mtDNA, and the Romanovs



How is the NIST Applied Genetics Group most helpful to you in your work?

1. STRBase information
2. Training workshops
3. SRMs
4. Research papers & presentations
5. More than one of the above choices
6. None of the above



Contributors to These Workshop Slides



Becky Hill

NIST

STRs



Erica Butts

NIST

**ABI
3500**



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**Florida
International
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CE



Robin Cotton

**Boston
University**

Mixture Interpretation



Catherine Grgicak

**Boston
University**



Charlotte Word

Consultant

NIST and NIJ Disclaimer

Funding: Interagency Agreement 2010-DN-R-7121 between the [National Institute of Justice](#) and NIST Office of Law Enforcement Standards

Points of view are the presenters and do not necessarily represent the official position or policies of the US Department of Justice or the National Institute of Standards and Technology.

Certain commercial equipment, instruments and materials are identified in order to specify experimental procedures as completely as possible. In no case does such identification imply a recommendation or endorsement by the National Institute of Standards and Technology nor does it imply that any of the materials, instruments or equipment identified are necessarily the best available for the purpose.

SWGDM and FBI CODIS Loci WG Disclaimer...

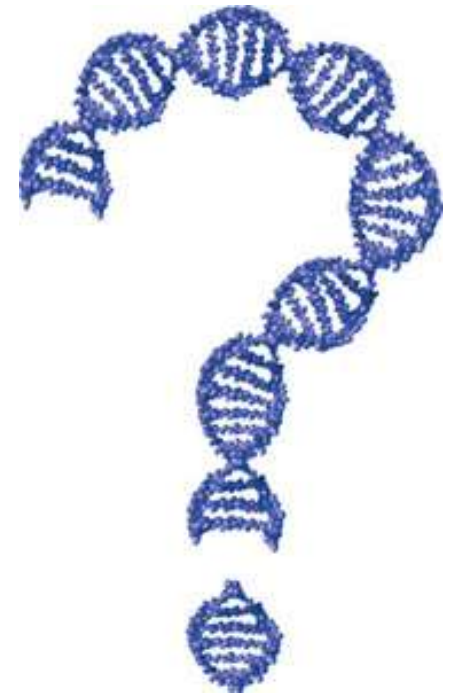
Now on with the workshop...

Our team publications and presentations are available at:
<http://www.cstl.nist.gov/biotech/strbase/NISTpub.htm>

Funding from the **National
Institute of Justice (NIJ)**
through NIST Office of Law
Enforcement Standards



Questions?



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