

Scientific Working Group on DNA Analysis Methods (SWGDM) July 2022 Report

July 18-21, 2022

Virtual Meeting

I. Agenda:

Please see Attachment 1.

II. Meeting Synopsis:

Monday, July 18, 2022

The SWGDAM Chair, Anthony Onorato, welcomed attendees and noted that the four-day afternoon format was in response to suggestions received after the January virtual meeting. The Chair introduced Richard Wilson, Chief of the Federal Bureau of Investigation's (FBI) CODIS Unit, for an update on the annual CODIS Conference who explained that they were trying for a hybrid in-person and virtual meeting with a final decision on the format soon. The SWGDAM Chair noted that the SWGDAM meeting was a bit later this year in the hopes of an in-person meeting but that was not possible because of the high infection rates. The Chair reviewed the goals for today's presentations -- to address Standard 8 and software.

KEYNOTE SESSION:

SWGDM QA Committee Chair Jocelyn Carlson introduced the keynote speaker, Alyson Fick, Manager at ASTM International in Standards Development. Ms. Fick explained how she collaborates with Committees on the procedure for developing standards and the process to ensure that the standards are recognized for quality and relevance in addressing the needs of users. She noted that standards development organizations are focusing on diversity, equality and inclusion - all important criteria to ensure the positive contributions of all. Ms. Fick noted that SWGDAM has a history and consensus to create standards for a quality product. She suggested that there may be items that SWGDAM can expand upon, such as time constraints, which is one that standards development organizations are confronted with and that being considerate of the various time zones of the participants is just one example.

TECHNICAL SESSION: QAS ANALYTICAL SOFTWARE REQUIREMENTS

Jocelyn Carlson with the FBI Laboratory's DNA Support Unit presented the current requirements of QAS Standard 8.8 and how that Standard expanded in scope over the years. She stated that there is no one size fits all approach and it may require more Technical Leader involvement in the process. Additional requirements were added to address the various types of software in the laboratory setting, such as instrumentation, interpretation, and statistical calculations.

Carl Sobieralski provided the OSAC perspective on standards. He reviewed the final versions that are at the Standards Development organization and noted that the content can change during this process.

Jill Spriggs, the ANAB Senior Manager of Accreditation, presented on the ANAB software requirements. There is a crosswalk document for the ANAB requirements. Ms. Spriggs described the process at ANAB and explained that she reviews completed QAS audits for issues (information left open) and will notify applicable assessors to complete the data. She noted in her reviews that Appendix E includes a variety of items, that often there are issues with minor v. major, developmental v. internal validation, etc.

Sandy Shaffer, NDIS Audit Review Panel Chair, presented on QAS Audit Software Issues. Ms. Shaffer explained that the audit issues include the following: software audited under the wrong category (analysis/interpretation, statistical calculations); software audited under the wrong type (new software or new module); and inconsistency among multi-laboratory systems. She provided examples of the categories (instrumentation, analysis/interpretation and statistical calculations) as well as those that do not impact the analytical process. Ms. Shaffer reviewed the FAQs on software standards and responded to questions from the attendees.

There was discussion of possible alternatives to provide clarity on the software requirements, such as focus on the big three categories (instrumentation, analysis/interpretation of data and statistical calculations). It was noted that while developmental validations may not be published, it is helpful to have vendors include more information in the user manuals. There was a suggestion that specific examples of modified procedures v. new procedures software would be helpful.

Tuesday, July 19, 2022

The Chair noted that today's technical session is on software development and we will be immersed in IT and the role of QAS and software requirements in assuring fit for purpose.

Dawn Herkenham with ECS Federal provided an update on artificial intelligence (AI) legislation (National Artificial Intelligence Initiative Act, AI in Government Act) and Executive Orders (Nos. 13960 and 13859) as well as pending AI Federal legislation. She reviewed legislation on genetic information passed by Idaho and Kentucky. Ms. Herkenham reviewed cases on the admissibility of probabilistic genotyping, including *People v. Davis* and *People v. Wakefield*. She also explained the decision in *Matter of Stevens v. NYS Division of Criminal Justice Services, et al.* involving the New York familial searching regulations.

Dr. Shibu Yooseph, Professor at the University of Central Florida (Genomics and Bioinformatics Lead Cluster) presented on “What exactly is software?” Dr. Yooseph provided a historical perspective as well as the AI we encounter daily. He reviewed the goals of AI such as logical reasoning and problem solving, task planning, learning relationships and patterns from data. Dr. Yooseph explained the three techniques of machine learning: supervised learning, unsupervised learning and reinforcement learning. Dr. Yooseph discussed DNA sequencing, genomics and machine learning; software systems (algorithm v. program); and forensics, genomics and machine learning.

Paul Black with the National Institute of Standards and Technology presented on “Software Assurance Standards and Quality Requirements.” Dr. Black noted that NIST is non-regulatory and therefore needs to get the community to voluntarily adopt the standards. He noted that the community has not settled on one way to develop software or to assess its suitability for a particular use. He explained that you need to decide on scope and criticality, in other words, how good does the software have to be? Having heard SWGDAM’s software discussions on Monday, what approach makes sense? He described that there are several software development guidelines and reviewed recommended minimum standards. Dr. Black went through the NIST Secure Software Development Framework (prepare the organization, protect the software, produce well-secured software, and respond to vulnerabilities). Dr. Black answered questions from the attendees on source code, testing, putting standards into practice, and one time v. multiple testing.

Wednesday, July 20, 2022

The Chair led a brief discussion of the previous day’s presentations before introducing the Committee and Working Group Update Session.

UPDATE SESSION

The following Committees and Working Groups provided updates to the attendees: Autosomal STR, CODIS, Laboratory Operations, Lineage Marker, and Next Generation

Sequencing. See <https://www.swgdam.org/committees> (bottom of page) for Committee/Working Group update slides.

ROUND TABLE

Ben Smith with the FBI's Criminal Justice Information Services Division presented on "Non-DNA Biometric Software Systems." Mr. Smith works on the facial recognition program as well as fingerprint capture devices. He explained that their testing is performance-based and that they are testing the automation of manual processes with a focus on functionality. Mr. Smith referred to the GAO Report on forensic algorithms noting that three entities test the forensic algorithms to ensure that they are reliable for law enforcement use: vendors and developers; law enforcement agencies or crime laboratories; and independent agencies.

Craig Watson with the National Institute of Standards and Technology (NIST) (Image Group Manager for Biometrics) presented on "Forensic Algorithm Vendor Tests." Mr. Watson explained that NIST has developed strong partnerships with Federal agencies and have become experts in biometrics and will issue best practices, make presentations and educate others. As part of a collaborative process and with the operational data, NIST will perform testing that includes an evaluation process, validation, full evaluation and publication of their results on their web site. He walked through an example of this process and noted that a rank number is also provided for demonstrating performance in comparison with others.

Timothy Zolandz with the FBI's CODIS Unit presented on "Software Development Strategies." Mr. Zolandz explained that testing is a major component at every stage of the process. He summarized the software development process as a series of processes, protocols, policies and procedures with multiple checks for review and quality. He noted that there are various approaches available to best satisfy the needs of the application and that structure, organization and commitment to the objectives are critical for success. Continuous improvement is required. Mr. Zolandz responded to attendees' questions and mentioned that more information is now included in the CODIS release notes regarding testing.

Thursday, January 13, 2022

COMMITTEE OF THE WHOLE SESSION

Thomas Callaghan, the FBI's Chief Biometric Scientist, provided an update on the Investigative Genetic Genealogy (IGG) Working Group. Dr. Callaghan noted that the Working Group had been meeting monthly and had presentations from researchers/scientists on next generation or whole genome sequencing. The Working Group has also been working on refining some of the IGG survey questions. Dr.

Callaghan noted that recent articles had identified that the use of law enforcement markers in research and the privacy implications of that use. The most immediate issue would be the admissibility of SNPs as evidence. Ted Hunt, Special Counsel with the FBI's Science and Technology Branch, reinforced that for admissibility, relevance and reliability are key. Mr. Hunt explained the importance of validation, interpretation guidelines and a quality architecture. Dr. Callaghan and Mr. Hunt led a discussion about any possible role for SWGDAM with respect to whole genome sequencing.

Douglas Hares, the FBI's Rapid DNA Implementation Advisor, provided an update on the Rapid DNA Committee and introduced a conceptual plan for addressing crime scene Rapid DNA changes for the QAS. Dr. Hares noted that the CJIS Advisory Policy Board had completed a draft requirements document for crime scene use which will work its way through their approval process. There was additional discussion about the role of the technical leaders, partner agencies and quantitation.

Amy McGuckian, Chair of the SWGDAM Working Group on Casework Expert Systems, provided an update on the status of the validation guidelines approved by SWGDAM as a Discussion Draft. Ms. McGuckian noted that the Validation Guidelines cannot be implemented until there are changes to the FBI Quality Assurance Standards for Forensic DNA Testing Laboratories (Forensic QAS) and the NDIS Operational Procedures Manual. She reviewed the necessary changes to the QAS (Standards 10, 12 and 17) as well as the NDIS Operational Procedures (Section 4.1.1 and the Expert Systems' provisions).

Ms. Jocelyn Carlson, Chair of the Quality Assurance Committee provided an update on the Committee's activities which included an adjudication of comments received on the QAS Guidance document. Christie Smith and Sandy Shaffer joined in the discussion on the QAS educational requirements and their collaboration with Forensic Science Education Programs Accreditation (FEPAC) and the American Academy of Forensic Sciences. Notices on the QAS educational requirements are being prepared for these organizations to share with their members. In addition to these efforts, the QAS mailbox receives many inquiries relating to the required course work. There was extensive discussion about the coursework requirements, the meaning of 'integral' and transferability of the education credentialing.

PARTER AGENCY UPDATE SESSION

Dr. Ray Wickenheiser presented an update for the American Society of Crime Laboratory Directors (ASCLD). Dr. Wickenheiser stated there are 700 members and encouraged technical leaders to become members. He explained AACLD's initiatives to promote quality operations: training, project foresight, promote accreditation and certification. Dr. Wickenheiser described that they are part of the Forensic Science Consortium and have a

Forensic Research Committee, ASCLD Accreditation Initiative, Rapid DNA Working Group and OSAC Standards Development. Future initiatives include OSAC Registry Standards implementation and recruitment of members.

Ms. Andrea Borchardt presented an update for the Bureau of Justice Assistance and their forensic suite of programs. Ms. Borchardt reviewed the Forensic Training and Technical Assistance Program, the Missing and Unidentified Human Remains Program, and CEBR. CEBR is about increasing capacity and has been a highly successful program; there may be an opportunity to provide performance data in the future. For FFY 2023, changes to CEBR will include aligning with the specific authorizing language and streamlining the application as well as new eligibility requirements.

Mr. Greg Dutton with the National Institute of Justice (NIJ) presented an update on their recently released Forensic Science Strategic Research Plan. Mr. Dutton reviewed the NIJ Forensic Biology Portfolio and explained that the FFY 2022 Forensic Science R&D proposals were currently under review. He noted that the National Best Practices for Improving DNA Laboratory Process Efficiency was released and that they were hoping to reconvene the Forensic Technology Working Group this fall.

Mr. Carl Sobieralski, Chair of the Biology/DNA Scientific Area Committee provided an update on the Biology SAC. He identified where the ASB published standards are available and reviewed ANSI/ASB Standards relating to Probabilistic Genotyping Systems, DNA Mixtures, DNA Interpretation and Comparison, and Training. He also reviewed OSAC proposed Standards on the Registry as well as Standards currently under development by Task Groups. An assessment guide and worksheet for use in evaluating whether a laboratory has satisfied Standard 40 requirements has also been developed.

Dr. Peter Vallone with the National Institute of Standards and Technology (NIST) presented an update on NIST activities. He reviewed the status of the following: SRM 2391d; SRM 2372a; CE concordance studies; performance-based approach for examining analytical threshold methods; FBI and NIST collaborative projects; exploring MCMC variability; sequencing projects; forensic DNA open dataset; and sequence-based allelic variation and frequencies for autosomal STRs. Dr. Vallone reviewed the upcoming meetings, including ISFG. He noted that work continues on the Mixture Report.

In conclusion, the SWGDAM Chair noted that additional revisions were made to the SWGDAM Bylaws and that there would be an e-mail vote on those this summer. He noted that the YHRD letter was sent out and the Y STR documents posted on the SWGDAM web site. He explained that the Joint OSAC/SWGDM Process Mapping Group has finalized their report but that SWGDAM had no comments on the final version. The next SWGDAM meeting will be January 10-12, 2023; more details to follow.

III. Attendees:

Please see Attachment 2.

IV. Next Meeting:

The next meeting will be held January 10-12, 2023.

Attachment 1 - Final Agenda



**SWGDM JULY 2022 VIRTUAL REGULAR MEETING
AGENDA**

Monday, July 18, 2022 1:00 PM – 5:00 PM ET

KEYNOTE SESSION: STANDARDS DEVELOPMENT

Alyson Fick, Manager, Standards Development, ASTM International

TECHNICAL SESSION: FORENSIC ANALYTICAL SOFTWARE REQUIREMENTS

Current Requirements of QAS Standard 8.8 – Jocelyn Carlson, FBI Laboratory

OSAC Software Standards – Carl Sobieralski, OSAC Biology SAC Chair

ANAB Software Requirements – Jill Spriggs, ANAB Senior Manager of Accreditation

Software Audit Issues and Inquiries – Sandy Shaffer, FBI Laboratory

Panel Discussion

Tuesday, July 19, 2022 1:00 PM – 5:00 PM ET

TECHNICAL SESSION: SOFTWARE DEVELOPMENT

Legislative Update (Including AI Legislation) – Dawn Herkenham, ECS Federal

Forensics in the Age of AI, Net-Generation DNA Sequencing, and Large Software Systems
– Dr. Shibu Yooseph, University of Central Florida

Software Standards and Quality Requirements – Paul Black, NIST

What Exactly is Artificial Intelligence? – Dr. Shibu Yooseph, University of Central Florida

Panel Discussion



SCIENTIFIC WORKING GROUP

DNA ANALYSIS METHODS

Wednesday, July 20, 2022

1:00 PM – 5:00 PM ET

COMMITTEE/WORKING GROUP UPDATE SESSION

ROUNDTABLE SESSION

Non-DNA Biometric Software Systems – Ben Smith, FBI CJIS Division

Forensic Algorithm Vendor Tests – Craig Watson, NIST

Software Verification Testing – Timothy Zolandz, FBI Laboratory

Open Discussion

Thursday, July 21, 2022

1:00 PM – 5:00 PM ET

COMMITTEE OF THE WHOLE SESSION

Update on IGG – IGG Working Group

Discussion of a Conceptual Crime Scene Rapid DNA QAS Addendum– R-DNA Committee

Discussion of QAS Considerations for Using Casework Expert Systems – Casework Expert System Working Group

Discussion of QAS Coursework Requirement – QA Committee

PARTNER AGENCY UPDATE SESSION

American Society of Crime Laboratory Directors

Bureau of Justice Assistance

National Institute of Justice

Biology/DNA Scientific Area Committee

National Institute of Standards and Technology

ADJOURNMENT

Attachment 2 - Attendees

**SWGDM January 2022 Virtual Meeting
July 18-21, 2022
Attendees***

SWGDM Chair
Anthony Onorato

SWGDM Vice Chair
Russell Vossbrink

SWGDM Executive Secretary
Dawn Herkenham

SWGDM Attendees

Chris Askew
Jack Ballantyne
Suzanne Barritt-Ross
Audra Bartels
Tiffany Bazazzadegan
Todd Bille
Andrea Borchardt
Thomas Callaghan
Jocelyn Carlson
Amber Carr
Dorothy Catella
Michael Coble
Jerrilyn Conway
James Corcoran
Jennifer Coursey
Brenda Danosky
Gregory Dutton
Eric Duvall
Neil Fernandopulle
Connie Fisher
Julia Garofalo
Russell Gettig
Katherine Gettings
Jade Gray
Ann Marie Gross
Lisa Grossweiler
Jessica Hanna
Douglas Hares

Brian Harmon
Bruce Heidebrecht
Joseph Hof
Bill Hudlow
Deedra Hughes
Ted Hunt
Jodi Irwin
Jessica James
Kristy Kadash
Ben Knoch
Jason Kokoszka
Brandon Letts
George Li
Jason Linder
Eugene Lien
Lauren Lu
Charla Marshall
Justin Maxwell
Barbara McCarty
Amy McGuckian
Scott McWilliams
Gary Molina
Shawn Montpetit
Ashley Murray
Vanessa Nelson
Mary Lou Nicholson
Sarah Noel
Jeff Nye
Darrel Oubre
Heather Parrish
Dixie Peters
Lisa Schiermeier-Wood
Alyssandra Shaffer
Phillip Simmers
Rhalie Simmons
Ben Smith
Christie Smith
Mark Smith
Carl Sobieralski
Melissa Suddeth
Joel Sutton
Tiffany Thoren

Andreas Tillmar
Peter Vallone
Jeanette Wallin
Craig Watson
Susan Welti
Ray Wickenheiser
Richard Wilson
Tiffany Vasquez
Shibu Yooseph
Timothy Zolanz

*Attendance confirmed at single time during
the virtual meeting.