

## **RANDALL STEVEN MURCH**

**Current Positions:** Research Program Development Team  
Office of the Vice President, National Capital  
Region; Professor in Practice, School of Public and  
International Affairs; Adjunct Professor, School of  
Plant and Environmental Sciences;  
Virginia Polytechnic Institute & State University  
(Virginia Tech)

Visiting Faculty  
Institute for Investigative Genetics  
University of North Texas, Health Sciences Center  
Fort Worth, Texas

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### **EDUCATION**

Bachelor of Science (Biology), University of Puget Sound, Tacoma,  
Washington; Graduated May 1974; Grade Point Average 3.36/4.0

Master of Science (Botanical Science, Specialty: Physiology of Host-Parasite  
Interactions), University of Hawaii, Honolulu, Hawaii; Graduated August 1976;  
Grade Point Average 3.6/4.0

Doctor of Philosophy (Plant Pathology, Specialty: Physiology of Host-Parasite  
Interactions), University of Illinois, Champaign-Urbana, Illinois; Completed  
September 1978, Conferred May 1979

Postdoctoral Teaching Associate, Department of Plant Pathology, University of  
Illinois, Champaign-Urbana, Illinois; September 1978-May 1979

Postdoctoral Research Associate, Department of Botany, Purdue University,  
West Lafayette, Indiana; October 1979-January 1980 (resigned to enter the  
Federal Bureau of Investigation)

## **POSITIONS HELD, DUTIES, RESPONSIBILITIES AND EXPERIENCE**

### **Virginia Tech, Office of the Vice President for Research and Office of the Executive Director, National Capital Region, December 2004-Present**

- Research Lead, Research and Development Team-National Capital Region: Identify new science, engineering and policy research initiatives, including those emanating from strategic partnerships between Virginia Tech and institutions in the NCR and elsewhere, and transfer them to other Virginia Tech faculty in Blacksburg and the NCR or pursue as research faculty; Pursue research grants and contracts in areas of interest
- Seek and initiate new outreach opportunities and partnerships with Federal, state and local agencies, as well as the private and commercial sector, for research, development and program development and lead them, particularly in areas involving the intersection of science and technology and national and international security
- Assist with and advance Virginia Tech's strategic initiatives in the NCR
- Hold two faculty appointments: Professor in Practice, School of Public and International Affairs, College of Architecture and Urban Studies and Adjunct Professor, Department of Plant Pathology, Physiology and Weed Science, College of Agriculture and Life Sciences
- Chair, NCR Research Council and NCR Representative to the University Commission on Research, 2004 - 2006
- Student Advising: Member, PhD Committees: Sonny Smith, Public Administration and Policy (completed May 2009); Co-Advisor, Justin Dunie, PhD candidate, Science and Technology Studies; Co-Advisor, James Fleming, Public Administration and Policy (completed June 2010); Co-Advisor, Tami Lee Mitchell, Public Administration and Policy (completed October 2011); Sarah Schmedes, Department of Forensic and Investigative Genetics, University of North Texas Health Sciences Center, Ft. Worth, TX (Completed June 2017); Member, PhD Committee, Nathan Ambler, Department of Industrial Systems Engineering (Completed May 2015)
- Serve in a pro bono advisory capacity on Federal and national-level science advisory panels
- Member, Virginia Tech Institutional Biosafety Committee, July 2013 – August 2016
- Detailee (through the Interdepartmental Personnel Act) from Virginia Tech to the Department of Homeland Security, Science and Technology Directorate, Office of Research, as Senior Principal Counselor for Science and Technology, February 2007 – January 2008
  - Provide senior level planning, review and coordination for strategic initiatives and programs of the Office of Research and Science and Technology Directorate

- Execute strategic liaison for the Directorate and Office with other U.S. Government agencies, the Department of Energy National Laboratories, the National Academies and Intelligence Community
- Serve as the DHS representative to interagency senior and executive advisory boards and steering committees
- Maintain membership in National Academies boards and study committees, Department of Defense advisory boards and that of the Intelligence Community
- Provide advice and counsel on matters of science, technology, operations, policy and management to the Directorate's senior leadership as requested
- Pursue research and study initiatives as Principal Investigator (PI), co-PI or team member, applied science, policy, integrated systems
- Visiting Professor, Program on Science and Security, Department of War Studies, King's College London, UK, 2005 – Present
- Visiting Faculty, Institute for Investigative Genetics, University of North Texas Health Science Center, Ft. Worth TX, 2010 - Present
- Operate in the capacity of Research Faculty through sponsored research and program development projects, 2008 – Present
- Detailee to the Department of Defense (via the Interdepartmental Personnel Act), 2011 (50% Level of Effort), 2012 (70% Level of Effort), 2013 – 2014 (100% Level of Effort) as Principal Science Advisor for a \$17M advanced science and technology development program.
- Detailee to the Department of Defense (IPA), Defense Threat Reduction Agency, Cooperative Threat Reduction Directorate, 50% Level of Effort, October 2018 – October 2020

*Institute for Defense Analyses, Science and Technology Division, December 2004-2007*

- Adjunct Staff Member, provide part-time, specialized support for studies and analyses tasked by U.S. Government agencies, 2004 - 2007

*Consulting*

- Lawrence Livermore National Laboratory, Center for Global Security Research, "Clear and Present Danger: Understanding and Responding to WMD Latency", 2005 – 2007; follow on studies pending
- Noblis, Falls Church, VA, 2008
- Unconventional Concepts, Inc. Arlington, VA, 2010
- Arete' Associates, San Diego CA and Chantilly VA, 2010 – 2011
- Forensic Casework Subject Matter Expert, 2011 – Present
- Federation of American Scientists, 2013 – 2015
- VERTIC, London, UK (US Department of State –funded project), 2018

**Research Staff Member, Institute for Defense Analyses. Science and Technology Division, December 2002 – December 2004**

- Plan and conduct classified and unclassified studies and analyses for Intelligence Community, Department of Defense and Department of Homeland Security sponsors.
- Director, Technology Discovery and Insertion Group (newly created with arrival at IDA)
- Invited membership on DoD senior study, discussion and review panels on critical intelligence, biological defense and homeland security topics

**Federal Bureau of Investigation: Positions Held, Assignments and Duties**

Summary

- Special Agent (GS-10 through 13), Federal Bureau of Investigation, January 1980-February 1985
- Supervisory Special Agent (GM-14 & 15), Federal Bureau of Investigation, February 1985- September 1995
- Supervisory Special Agent (Senior Executive Service), September 1995-2002, Final Rank: Deputy Assistant Director, SES-4
- Retirement: 30 November 2002 with nearly 23 years of service

Specific Assignments, Duties and Accomplishments

**July 2001 – November 2002, Laboratory Division and Investigative Technology Division, Quantico, Virginia:**

- Deputy Assistant Director (Head), Investigative Technologies Branch (ITB)
- Executive management and leadership of the FBI's technical surveillance, mobile communications and telecommunications programs (development, acquisition, test and evaluation, operational support, training, quality management, liaison)
- Area of responsibility consists of 4 sections (departments), 19 units, nearly 600 FBI personnel including 4 SES section chiefs (department heads), 19 GS-15 unit chiefs and 1 GS-15 special counsel, technical Agents, engineers, technicians, computer forensic examiners, technical program managers, administrative personnel and additionally ca. 190 on site contractors
- Budget development and oversight of ca. \$651 M program for the equipping, training and technical support for ITD programs, FBI field investigative programs and ca. 1200 field technical personnel
- Responsible for strategic organizational, business and resource management, technical leadership, vision development and planning
- Liaison with counterparts in FBI Headquarters and field divisions, other Government agencies, the U.S. law enforcement and Intelligence

Communities, academe, the Executive Branch, the Congress and friendly foreign governments

- Executive member and consultant for academic centers and interagency councils
- Invited Participant, “Strategic Future of U.S. Science and Technology”, Study by the Center for Global Security Research, Lawrence Livermore National Laboratory, for the Administrator, National Nuclear Security Administration, Department of Energy
- Reviewer, Study on “Countering Agricultural Bioterrorism: A Framework for Action”, National Research Council, 2002
- Responsible for proposal and then transition of Investigative Technologies Branch, Laboratory Division, to newest FBI national program division, the Investigative Technology Division
- Invited Member, Intelligence Community Collection Concepts Development Center Study, Summer 2002
- Deputy Assistant Director (deputy director), Investigative Technologies Division, newest FBI Headquarters division (ITB transition to ITD), Starting July 2002

*Detail Assignment: November 1999- June 2001, Defense Threat Reduction Agency, Fort Belvoir, Virginia:*

- Director, Advanced Systems and Concepts Office (ASCO), Defense Threat Reduction Agency (DTRA), Department of Defense (DOD) (detailed from the FBI)
- Leadership of advanced studies program within DTRA, (created with agency standup in October 1998 to greatly advance the intellectual capacity of the DTRA, DOD and others to reduce the threat of weapons of mass destruction across entire threat spectrum); during assignment oversaw the completion or initiation of ca. 30 high impact studies, including those directed by the Office of the Secretary of Defense and Executive Office of the President
- Day-to-day direction of 30 military officers (O-5/O-6), detailees from other Federal agencies, contractors, IPAs from National Laboratories and Federally Funded Research and Development Centers (FFRDC) and DOD employees (began with 6 personnel upon reporting to DTRA)
- Re-engineered ASCO mission statement and focus, developed diversified investment strategy for projects and conferences for greatest impact across threat spectrum, reorganized ASCO for greatly improved performance
- Personally initiated and guided several novel ASCO projects
- Increased numbers, available expertise and quality of personnel within ASCO and increased budget by 25% within first six months, with follow-on enhancements achieved (\$10M budget by departure)

- Established interactive working relationships with other DTRA directorates and executive management
- Established close personal working relationship and enhanced administrative, logistical and technical support by ASCO to the Threat Reduction Advisory Committee (DTRA advisory board, consisting of former senior flag officers, former senior DOD, DOE and OGA executives, a Nobel laureate and other leading academics, current senior OGA executives)
- Government advisor, Defense Science Board Summer Study on Intelligence Needs for Domestic WMD Response (2000) and Intelligence Needs for Homeland Defense- Biological Warfare/Terrorism Panel (2001);
- Reviewer, DARPA Biological Warfare Defense Program
- Facilitated 8 new corporate initiatives for DTRA's Chemical and Biological Defense programs (2000 and following), some of which leveraged ASCO studies
- Assigned lead for key systems analysis expected to develop into design of a \$50+ million Advanced Technology Demonstration for a novel point-of-care infectious disease surveillance and biological defense capability

June 1997-November 1999, Laboratory Division, Washington, D.C.:

- Deputy Assistant Director (Head), Forensic Analysis Branch.
- Executive manager for two sections (departments), 13 units, over 400 employees, which included all accredited forensic case working disciplines, and the forensic research and development program
- Senior executive manager for strategic planning and execution, technical operations, forensic services, national security and counter-terrorism support, research and development, business process re-engineering, technical resource enhancement and allocation, and intramural and extramural liaison with the national and international forensic and broader scientific communities (e.g., the Department of Energy National Laboratories)
- Created a novel program with the National Laboratories for research and development, technology transfer, special analytic support, training and hazardous materials response for the FBI and U.S. crime laboratory community
- Continued oversight of FBI Laboratory routine and major case (including international, e.g., Khobar Towers, USS Cole, U.S. Embassy bombings in East Africa) forensic investigative responses
- Co-developed the FBI Laboratory 1999-2004 strategic plan with the Laboratory Director
- Executive management of the FBI Laboratory Quality Program, which was responsible for the first-ever accreditation of the Laboratory through the American Society of Crime Laboratory Directors (ASCLD)-Laboratory Accreditation Board;

- Elected member, Board of Directors, ASCLD
- Developer and manager for four senior scientists (biology, chemistry, hazardous materials, materials science)
- Co-developer, *Forensic Science Communications* (first ever on-line forensic science journal)
- National leadership and extensive interaction with peers in Federal agencies for the development and execution of coordinated and effective response to the illicit threatened or actual possession or use of hazardous biological, chemical or nuclear materials
- Reviewer for DARPA Biological Warfare Defense Program research proposals

September 1995-June 1997, Laboratory Division, Washington, D.C.:

- Section Chief (department head), Scientific Analysis Section.
- Department head for forensic services, managed department of ca. 200 Agent, scientist, technician and administrative personnel
- Responsible for the day-to-day operations and strategic advancement of the clinical analytic units which analyzed physical evidence as DNA, trace evidence, explosives, firearms and toolmarks, chemistry, materials analysis, forensic DNA and ballistics informatics systems, hazardous materials (chemical, biological, nuclear) response, and the FBI's national bomb technician training program (including research and development of new tools and capabilities)
- Executive management of FBI Lab forensic support to the TWA 800, bombing of the Murrah Federal Building, Olympic Park bombing and follow up to the World Trade Center bombing cases
- Designated Federal Employee, DNA Advisory Board (Congressionally-mandated national forensic DNA policy board)
- Technical leadership and management design and oversight for major overhaul of FBI Laboratory Quality Management System and the first-ever accreditation of the FBI Laboratory (in response to inquiries by the Congress and Office of the Inspector General, Department of Justice)
- Member, FBI Senior Red Team panel, FBI's National Crime Information Center 2000 and Integrated Automated Fingerprint Identification System;
- Government Consultant, Department of Defense Inspector General Death Investigation Review Board
- Created the Hazardous Materials Response Unit (novel and unique WMD forensic response unit, the nation's and world's first forensic WMD investigative program and progenitor of all other WMD forensic science and technology support programs in the United States and elsewhere)
- Created the Advanced Render Safe Team Program, Bomb Data Center;
- Science Advisor to the Special Agent in Charge, FBI Atlanta Division, Chemical and Biological Incident Response, 1996 Olympic Games; established first-ever strategic program for coordinated bioterrorism

response to special events, with the Centers for Disease Control and Prevention, medical and technical organizations of the Department of Defense and other at the Federal, State and local levels

- Extensive scientific and operational planning liaison with FBI Headquarters, and numerous national technical and medical agencies for coordinated chemical-biological terrorism response
- Acquired \$19 million in new counterterrorism research and development funding
- Government advisor, Defense Science Board, Summer Study on Trans-National Threats (April-August 1997).

February 1995-September 1995, New York, New York:

- Supervisor, Squad SO-6 (Technical), Special Operations Branch, New York Field Office
- Day-to-day supervision and operational planning for 27 Technically Trained Agents, Special Agents and administrative support personnel to provide field technical support for all investigative squads of the New York Office
- Personally supervised many complex and sensitive technical operations
- Extensive liaison with squads throughout the New York Office and those in other field offices, as well as the Engineering Section, National Security Division, and other U.S. Government agencies
- Acquired funding from the Office of National Drug Control Policy, established the New York Test Bed (operated by the FBI New York) to provide field test and evaluation of promising, near-term tactical technologies for the FBI and law enforcement
- Designed and established the FBI's Northeast Regional Technical Training Center
- Acting Assistant Special Agent in Charge, Technical Branch, Special Operations Division, August-September 1995.

June 1994-January 1995, New York, New York:

- Supervisor, Squad SO-1 (Technical), Special Operations Branch, New York Field Office.
- Day-to-day supervision and planning oversight for the activities of 27 Technically Trained Agents, technical and administrative support personnel
- Responsible for the operations, maintenance and upgrade of the Central Monitoring Plant (largest in the FBI), which supported for all investigative programs of the New York Office
- Restructured the CMP to improve capabilities and management oversight
- Provided technical leadership for many operations and investigations



- Conducted extensive liaison throughout the New York Office, Engineering Section, Technical Services Division and National Security Division (formerly Intelligence Division) and U.S. Government agencies
- Improved technical training for Squad SO-1 and other technical squads using Engineering Section and other U.S. Government resources

January 1991-June 1994, Information Resources Division, Quantico, Virginia:

- Chief, Advanced Science and Applications Unit, Engineering Section
- Direct management of 28 Technically Trained Agents, electronics engineers and electronics technicians assigned to develop and execute classified research and development and technical operations support
- Oversaw 50% of all research and development projects for the Engineering Section, while supporting 50 operations at any one time
- Extensive liaison throughout the Engineering Section, FBI Headquarters, the Intelligence Community, Department of Energy national laboratories, Office of National Drug Control Policy and Defense Advanced Research Projects Agency, and friendly foreign governments
- Personally initiated the successful acquisition of ca. \$20 million in new funding over 2.5 years, and had direct management or indirect influence over ca. \$32 million in engineering development and applications funding

July 1988-December 1990, Intelligence Division, Washington, D. C.:

- Project manager for several complex technical projects that supported the FBI's national security program (responsible for initiation, program supervision, operational requirements analysis, operational-technical interface, financial management, reporting, requests for legal authority)
- Extensive technical and operational liaison with FBI New York, FBI senior management, the Intelligence Community, Congress, friendly foreign governments and contractors.

July 1987-June 1988, Laboratory Division, Quantico, Virginia:

- Research and development of forensic DNA technologies for new national program for the analysis of biological fluid and hair
- Instructor for graduate courses in forensic genetics testing methods
- Liaison with commercial genetics testing firms
- Developer and program chair, First International Symposium for Forensic DNA Technology, held at the FBI Academy, June 1988.

May 1982-June 1987, Laboratory Division, Washington, D. C.:

- Scientific expert in forensic serology/biochemistry, performed clinical biochemical and genetic analysis of physical evidence on nearly 1000 cases involving crimes of violence
- Performed ca. 30 crime scene investigations throughout the U.S., in Mexico and El Salvador
- Testified over 90 times as an expert witness in Federal, county and municipal courts of law throughout the U.S., on evidence and the introduction of novel technologies in the courts
- Instructor for accredited graduate courses in advanced biochemical methods of biological fluid analysis
- Research and development of novel forensic methods of biological fluid analysis, liaison and collaboration with Laboratory Division research unit
- Manager, advanced forensic genetics testing program (110,000 samples per year, 4 technicians)
- Pre-publication reviewer for scientific papers for the Laboratory Division

January 1981-April 1982, Los Angeles, California:

- Field investigations in counterterrorism, Atomic Energy Act matters, bombing matters, passport fraud, protection of foreign officials and establishments
- FBI liaison for threat assessment contractor (RAND Corporation), Department of Energy liaison
- Divisional coordinator for nuclear/biological/chemical terrorism response planning and policy formulation for the 1984 Olympic Games

April 1980-January 1981, Indianapolis, Indiana:

- Field investigations in counter-intelligence; counter-terrorism; civil rights; impersonation of a Federal officer; crimes on government reservations; applicant matters.

January 1980-April 1980:

- New Agent's Training, FBI Academy, Quantico, Virginia.

**PROFESSIONAL DEVELOPMENT**

- Special Weapons and Tactics (SWAT) Defensive Tactics, October 1980
- Basic Counterintelligence Course, July 1981
- Nuclear Emergency Search Team Orientation, February 1982
- Biochemical Methods in Bloodstain Analysis, July 1982

- Basic Forensic Serology, August 1982
- Crime Scene Investigation, October 1982
- Advanced Law Enforcement Instructor Development, May 1984
- Bombing Crime Scene Investigation, May 1985
- Project Management Seminar, September 1988
- Counterintelligence Indoctrination Course, January 1989
- U.S. Air Force Soviet Awareness Course, April 1989
- Management Aptitude Program, Level 1, May 1989 (rating: high aptitude)
- Project Management Seminar, September 1989
- Foreign Science and Technology Interests, April 1990
- Electrical Engineering and Modern Electronics for Non-Electrical Engineers, George Washington University, Washington, D.C., June 1990
- Systems Engineering, George Washington University, Washington, D.C., January 1992
- Contracting Officer's Technical Representative Course, March 1992
- Basic Electronics Correspondence Course, November 1993-May 1994
- Technical Trained Agent's Certification Course (Audit), May-June 1994
- Cellular Telephony, September 1994
- Telecommunications Fundamentals I, Bellcore, Lisle, Illinois, October 1994
- Telecommunications Fundamentals II, Bellcore, Lisle, Illinois, December 1994
- Executive Development Institute I, October 1996
- Managing Change in Organizations Seminar, James Madison University, March 1997
- Informal Resolution of EEO Complaints, October 1997
- Executive Seminar in Federal Personnel Law and Applications, Carnegie Institution, Washington, D. C. January 1999
- Visualizing Information, E. Tufte, Yale University, at Crystal City, Virginia, May 2001
- Information Operations, October 2003
- Writing Successful Grants, Virginia Polytechnic Institute and State University, November 2005
- Finding Funding, Virginia Polytechnic Institute and State University, Office of the Vice President for Research, Faculty Development, September, 2009

**GRADUATE AND EARLY CAREER LABORATORY RESEARCH EXPERIENCE**

- Production, characterization and effects of extra-cellular toxins from bacterial leaf pathogens of soybean and bean. University of Hawaii, 1974-1976.

- Effects of selected environmental factors on isoflavanoids (defense compounds) accumulation in soybean in response to fungal pathogen infection. (Graduate Research Assistant) University of Illinois. 1976-1979.
- Development of improved or novel electrophoretic analytical methods for the genetic analysis of biological fluids for forensic purposes. FBI Laboratory, 1983-1987
- Development and applications of restricted fragment length polymorphism (RFLP) and polymerase chain reaction (PCR) methods to the analysis of biological materials of forensic interest. FBI Laboratory, 1987-1988.

### **TEACHING EXPERIENCE**

- Undergraduate Teaching Assistant, Biology Department, University of Puget Sound, 1973-1974.
- Graduate Teaching Assistant, Division of Botanical Sciences, University of Hawaii, 1974-1976.
- Graduate Teaching Assistant, Department of Plant Pathology, University of Illinois, 1977-1978 (required of all research assistants).
- Postdoctoral Teaching Associate, Department of Plant Pathology, University of Illinois, 1978-1978.
- Adjunct Professor, University of Virginia (cooperative program with the FBI Laboratory), 1984-1988
- Adjunct Professor, Advanced Topics in Science and Technology Policy: *Homeland Security as a Complex System of Systems*, Center for Public Administration and Policy, Virginia Tech, Spring 2008
- Adjunct Professor, Advanced Topics in Science and Technology Policy, *Homeland Security: Response and Recovery*, Center for Public Administration and Policy, Virginia Tech, Spring 2009 (team taught)
- Adjunct Professor, *Introduction to Science and Technology Policy*, Master of Science program in Industrial Systems Engineering, Virginia Tech, for the National Reconnaissance Office, Fall 2010
- Professor in Practice, Advanced Topics, *Homeland Security and Terrorist Threats*, Fall 2012
- Professor in Practice, *Introduction to Science and Technology Policy*, Master of Science program in Industrial Systems Engineering, Virginia Tech, for the National Reconnaissance Office, Spring 2014
- Professor in Practice, *Introduction to Science and Technology Policy*, Master of Science program in Industrial Systems Engineering, Virginia Tech, for the National Reconnaissance Office, Spring 2016 (course preparation, first three sessions)

**RECENT AND CURRENT SPONSORED RESEARCH AND STUDY  
ACTIVITIES:**

- *Roadmap for Bioforensics Science and Technology*, Sponsor: Defense Threat Reduction Agency, 2006-2007, \$37,058
- *Future of Cooperative Threat Reduction*, Sponsor: Defense Threat Reduction Agency, 2008 – 2009, \$36,864
- Indefinite Delivery, Indefinite Quantity Contract for Strategic Advice, Analysis and Task Support, MITRE Corporation, 2009, \$48,823
- Subcontractor to Biometric Support Center, Operated by BAE Systems for Department of Homeland Security, US-VISIT Program; Principal Investigator, Development and Transition of a Applied Biometrics Examiner Training Course, Certification Program and Quality Management System, December 2009 – December 2011, Award Amount: \$484,622
- Grantee, National Institute of Justice, Development of a Quantitative Foundation for Sufficiency in Friction Ridge (Fingerprint) Patterns, October 2009 – December 2011, Award Amount: \$854,907
- Subcontractor to Science Applications International Corporation (SAIC), sponsor was Defense Threat Reduction Agency, Department of Defense; Principal Investigator and Team Lead, Bio Attribution Science Strategy, Plan and Concept of Operation, December 2009 – December 2010, Award Amount: \$500,000 (\$301,250 to Virginia Tech)
- Subcontract to IEM, Inc., Small Business Mission Support IDIQ Task Order Contract to the US Army Edgewood Chemical and Biological Center (Chemical, Biological, Radiological, Nuclear and Explosive Defense), Principal Investigator for Virginia Tech
- Subcontractor to Booz Allen Hamilton (BAH), Cooperative Threat Reduction A&AS contract, Cooperative Biological Engagement Program, Defense Threat Reduction Agency (DTRA), Ft. Belvoir, VA (ceiling Year 1, \$520,000, time and materials, four option years, total potential value of subcontract is \$2.25M ); Principal Investigator for Virginia Tech
- Interdepartmental Personnel Act, Department of Defense, Assignment as Principal Advisor for Microbial Forensics, March 2011 – January 2015; Covers 100% salary CY2013 – 2014, associated fringe benefits and indirect fee, and travel; total funding 2011 – 2014 was ca. \$1.099M
- Senior Adjunct Scientist for the Joint Program Executive Office-Chemical and Biological Defense, Subcontract through Johns Hopkins University-Applied Physics Laboratory, October 2014 – December 2015, 60% Level of Effort, Total Subcontract Award: \$305,451
- Department of State, via CRDF Global, Microbial Forensics Capacity Building in Indonesia: Phase 1, July – September 2015, Subcontract Award: \$47,048

- Senior Adjunct Scientist for the Joint Program Executive Office-Chemical and Biological Defense, Subcontract through Johns Hopkins University-Applied Physics Laboratory, December 2015 – August 2017, 25% Level of Effort, Total Subcontract Award: \$237,104
- United States Strategic Command, “Cyberbiosecurity: Protecting the Emerging Domain of Biomanufacturing”, Co-Originator and Principal Investigator for 1-year foundational study as a collaboration between Virginia Tech, Colorado State University and the University of Nebraska-Lincoln, September 2016 – September 2017, Total Contract Award: \$749,945
- Senior Adjunct Scientist for the Joint Program Executive Office-Chemical and Biological Defense, 25% LOE, Subcontract through Johns Hopkins University-Applied Physics Laboratory, January 2017 – August 2017, Total Subcontract Award: \$54,894
- Senior Adjunct Scientist for the Joint Program Executive Office-Chemical and Biological Defense, 25% LOE, Subcontract through Johns Hopkins University-Applied Physics Laboratory, September 2017 – December 2017, Total Subcontract Award: \$27,725
- Senior Subject Matter Expert – Biosecurity, 25% LOE, Defense Threat Reduction Agency, Cooperative Threat Reduction Directorate/Integration, February 2018 – February 2019, Total Purchase Order Award: \$102,905
- Senior Subject Matter Expert – Biosecurity, Defense Threat Reduction Agency/Integration, Interdepartmental Personnel Act, 50% Level of Effort, September 2018 – August 2019, Total Award: \$131,684 plus travel funds; Modified September 2018 to run from October 2018 – October 2019

## **PUBLICATIONS**

Murch, R. S. and S. S. Patil. 1976. Comparisons of the exotoxins of *Pseudomonas glycinea* and *Pseudomonas phaseolicola*. Proc. Amer. Soc. Phytopathol. 3:269.

Murch, R. S. and J. D. Paxton. 1977. Glyceollin concentrations in Phytophthora-resistant soybeans: light influence. Proc. Amer. Soc. Phytopathol. 4:135-136.

Murch, R. S. and S. S. Patil. 1978. Comparative studies of the exotoxins of *Pseudomonas glycinea* and *Pseudomonas phaseolicola*. Can. J. Bot. 56:282-287.

Murch, R. S., M. C. Shurtleff and B. J. Jacobsen. 1978. Iron chlorosis: cause and control. Report on Plant Disease No. 603. Department of Plant Pathology, University of Illinois.

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Murch, R. S. and J. D. Paxton. 1980. Rhizosphere anaerobiosis and glyceollin accumulation in soybean. Phytopathol. Z. 96:91-94.

Murch, R. S. and J. D. Paxton. 1980. Environmental stress and phytoalexin accumulation in soybean. Bull. Soc. Fr. Act. Bot. 127(1):151-153.

Murch, R. S. and J. D. Paxton. 1980. Temperature and glyceollin accumulation in Phytophthora-resistant soybean. Phytopathol. Z. 97:282-285.

Murch, R. S. and B. Budowle. 1984. Evaluation of erythrocyte acid phosphatase typing by isoelectric focusing using casework samples. Proc. Intl. Symp. Forens. Applic. Electrophor. pp. 163-164.

Murch, R. S. 1985 the FBI Serology Unit: services, policies and procedures. FBI Law Enforcement Bulletin 54(3): 15-21.

Budowle, B. and R. S. Murch. 1985. A high resolution, rapid procedure for alpha-1-antitrypsin phenotyping. Electrophoresis 6: 523-525.

Murch, R. S. and B. Budowle. 1986. Forensic applications of isoelectric focusing. J. Forensic Sci. 31(3): 869-880.

Budowle, B., R. S. Murch, L. C. Davidson, A. M. Gambel and J. J. Kearney. 1986. Subtyping phosphoglucomutase in semen stains and bloodstains: a report on the method. J. Forensic Sci. 31(4): 1341-1348.

Murch, R. S., A. M. Gambel and J. J. Kearney. 1986. A double origin method for the simultaneous separation of adenosine deaminase, adenylate kinase and carbonic anhydrase II. J. Forensic Sci. 31(4): 1349-1356.

Budowle, B. and R. S. Murch. 1987. Forensic applications of isoelectric focusing. II. In: New Directions in Electrophoretic Methods. ACS Symposium Series 335: Chapter 10, 143-157.

Budowle, B., H. A. Deadman, R. S. Murch and F. S. Baechtel. 1988. An introduction to the methods of DNA analysis under investigation in the FBI Laboratory. Crime Laboratory Digest 15 (1): 8-21.

Murch, R. S. and B. Budowle. 1998. Are forensic DNA technologies developed with privacy and confidentiality in mind? In: Genetic Secrets: Privacy, Confidentiality and New Genetic Technology, M. Rothstein, ed. Yale U. Press, New Haven. Chapter 12: 212-230.

Monson, K. and R. S. Murch. 1999. The use of robotics in law enforcement. FBI Law Enforcement Bulletin.

Murch, R. S. 1999. The new ecology of quality assurance. Forensic Science Communications. April 1999, [www.fbi.gov](http://www.fbi.gov).

Murch, R. S. 2001. Forensic perspective on bioterrorism and bioproliferation. In: Firepower in the Laboratory: Proceedings of the Symposium on Research Needs for Laboratory Automation and Bioterrorism, July 2001, National Academy of Sciences Press, Washington DC, pp 203 - 214

Murch, R. S. 2003. Microbial forensics: building a national capacity to investigate bioterrorism. Biosecurity and Bioterrorism: Biodefense Strategy, Practice and Science 1 (2): 117-122.

Scheiber, L. B., J. E. Hartka and R. S. Murch. 2003. Defender's Edge: Utilizing intelligent agent technology to anticipate terrorist acts. Institute for Defense Analyses Document D-2849, Alexandria VA

Murch, R. S. 2004. The FBI. In: Encyclopedia of Bioterrorism. Center for Nonproliferation Studies, Monterey Institute for International Studies. J. Wiley and Sons

Murch, R. S., A. Stone, M. A. Finnin, S. M. Briglin, J. A. Buxe, J. R. Good and B. Greenwald. 2004. Microbial Forensics Baseline Study. Report of the Institute for Defense Analysis, December 2004, 371 ppg

Budowle, B., S. E. Schutzer, M. S. Ascher, R. M. Atlas, J. P. Burans, R. Chakraborty, J. J. Dunn, C. M. Fraser, D. R. Franz, T. J. Leighton, S. A. Morse, R. S. Murch, J. Ravel, D. L. Rock, T. R. Slezak, S. P. Velsko, A. C. Walsh and R. A. Walters. 2005. Toward a system of microbial forensics: from sample collection to interpretation of evidence. Applied and Environmental Microbiology, May 2005: 2209-2213

Budowle, B., R. S. Murch and R. Chakraborty. 2005. Microbial forensics: the next great forensics challenge. International Journal of Legal Medicine, published on line April 9, 2005



Budowle, B., M. D. Johnson, C. M. Fraser, T. J. Leighton, R. S. Murch and R. Chakraborty. 2005. Genetic analysis and attribution of microbial forensics evidence. *Critical Reviews in Microbiology* 31:233-254.

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Leighton, T. and R. Murch. 2007. Roadmap for Bioforensics Science and Technology. DTRA Technical Instruction 18-05-14, DTRA Contract 01-03-D-0017, Task Order 0018, 89 ppg.

Budowle, B., S. E. Schutzer, S. A. Morse, K. F. Martinez, R. Chakraborty, B. L. Marrone, S. L. Messenger, R. S. Murch, P. J. Jackson, P. Williamson. R. Harmon and S. P. Velsko. 2008. Criteria for validation of methods in microbial forensics. *Applied and Environmental Microbiology* 74 (18): 1-9

Murch, R. 2008. How to Prevent the Next Biological Attack. *The Bulletin of the Atomic Scientists*. <http://thebulletin.org/web-edition/features/how-to-prevent-the-next-biological-agent-attack>

Murch, R. S. and J. Tamsett. 2008. Early Warning and Prevention of Jihadi WMD Terrorism: Law Enforcement and Intelligence. In: *Jihadists and Weapons of Mass Destruction*, Gary Ackerman and Jeremy Tamsett, eds., CRC Press, pp 241 - 258

Gallup, S. P., J. Freeman, R. Murch, T. Smith, H. Moore, A. Glynn and J. Chilton. 2008. Human Interoperability: Experimentation to Understand and Improve the Human Component of Complex Systems. U.S. Naval Postgraduate School Publication NPS-IS-08-005

Murch, R. S. 2009. How Will We Know When We are Biosecure? *The Journal of Biolaw and Business* (accepted)

Leighton, T. and R. Murch. 2010. Biorepositories and Their Foundations: Microbial Forensic Considerations. Chapter 34, In: Microbial Forensics, 2<sup>nd</sup> Edition, Academic Press, pp 581-604

Murch, R. S. and E. L. Bahr. 2010. Validation of Microbial Forensics in the Scientific, Legal and Policy Contexts. Chapter 38, In: Microbial Forensics, 2<sup>nd</sup> Edition, Academic Press, pp 649 – 666

Murch, R. S. 2010. How Best Can the U.S. Protect Itself Against Agroterrorism? Chapter 12, In: Controversies in Science and Technology, Mary Ann Liebert, Inc., New Rochelle, NY, pp 161 – 171

Murch, R. S. 2011. “Amerithrax”: The Investigation of Bioterrorism Using Anthrax in Mailed Envelopes, 2001 – 2008. In: Encyclopedia of Bioterrorism Defense, 2<sup>nd</sup> Edition, John Wiley and Sons

Murch, R. S. 2011. The Internationalization of Microbial Forensics to Advance Global Biosecurity. Chapter 31, In: Turning International Obligations into Effective National Action: The 2007 – 2010 Intercessional Process of the Biological Weapons Convention. Edited by the United Nations Implementation Support Unit, Geneva, Switzerland.

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Murch, R. S. 2012. To Publish or Not Publish (H5N1), *The Scientist*, April 2012, p. 44

Budowle, B., S. E. Schmedes and R. S. Murch, 2013. The Microbial Forensics Pathway for Use of Massively-Parallel Sequencing Technologies. National Research Council, Institute of Medicine Workshop Report, “The Science and Applications of Microbial Genomics” April 2013, Appendix A: 117 – 133

Budowle, B., S. Minot, N. D. Connell, A. Bielecka, R. R. Colwell, C. R. Corbett, M. Forsman, D. R. Kadavy, A. Markotic<sup>1</sup>, Stephen A. Morse, R. S. Murch, A. Sajantila, S. E. Schmedes, K. Ternus, S. Turner. 2014. Validation of High Throughput Sequencing and Microbial Forensics Applications. *Investigative Genetics* 5:9

Murch, R. S. 2014. Designing an Effective Microbial Forensics Program for Law Enforcement and National Security Purposes. *Archivum Immunologiae et Therapiae Experimentalis*, DOI 10.1007/s00005-04-0289-7, 30 April 2014 or Vol 62 (3): 179 – 185

Murch, R. S, 2015. Bioattribution Needs an Organized International Approach to Improve Global Biosecurity. *Front. Bioeng. Biotechnol.* 1 June 2015, <http://dx.doi.org/10.3389/fbioe.2015.00080>

Kilanski, A. and R. Murch. 2015. When is Gain of Function Research not “Gain of Function” Research. *EMBO Reports* DOI 10.15252/embr, Published Online 04.11.2015 (November 4, 2015)

Bidwell, C. A. and R. Murch. 2016. Use of Microbial Forensics in the Middle East/North Africa Region. Report to the U.S. Department of State Verification Fund Contract AAQMMA14M2044. Federation of American Scientists, Washington, D.C. March 9, 2016.

Murch, R. S. 2016. CSI<sup>2</sup>: CBRN Crime Scene Investigation. *CBRNe World*, October 2016: 39 – 44

Peccoud, J., J. Gallegos, R. Murch, W. Buchholz and S. Raman. 2017. Cyberbiosecurity: From Naive Trust to Risk Awareness. *Trends in Biotechnology*, 36 (1): 4 – 7. DOI: <http://dx.doi.org/10.1016/j.tibtech.2017.10.012>

Murch, R. S. 2018. Chapter 5, A Perspective on the Strategy of Intelligence. pp. 43 – 74. In: *Defence Against Bioterrorism: Methods for Prevention and Control*. NATO Science for Peace, Series A: Chemistry and Biology, Proceedings of a NATO Advanced Research Workshop, Belgrade, Serbia, March 16 -17, 2017. Springer, Dordrech, The Netherlands. <https://doi.org/10.1007/978-94-024-1263-5>

Murch, R. S., K. L. W. So, S. Raman, W. Buchholz and J. Peccoud. 2018. Cyberbiosecurity: An Emerging New Discipline to Help Safeguard the Bioeconomy. *Front. Bioeng. Biotechnol.* Vol. 6, Article 39, 6 ppg. doi: 10.3389/fbioe.2018.00039

Murch, R. 2018. Biosecurity Evolving as Cyber Threats Emerge. Homeland Security Today. March 26, 2018. <https://www.hstoday.us/subject-matter-areas/wmd/biosecurity-evolving-cyber-threats-converge/>

Murch, R. 2018. Navigating Cyberbiosecurity Threats and New Security Frontier. Homeland Security Today. April 16, 2018. <https://www.hstoday.us/subject-matter-areas/wmd/navigating-cyberbiosecurity-threats-new-security-frontier/>

Murch, R. S. and B. Budowle, 2019. An International Microbial Forensics Research Strategy and Its Collaborative Pursuit is Needed. In: Microbial Forensics, 3<sup>rd</sup> Edition, B. Budowle, S. Schutzer and S. Morse, Eds., Elsevier (In press, Due Out May 2019)

Bidwell, C. and R. Murch. 2019. Use of Microbial Forensics Data in Scientific, Legal, and Policy Contexts. In: Microbial Forensics, 3<sup>rd</sup> Edition, B. Budowle, S. Schutzer and S. Morse, Eds., Elsevier (In press, Due Out May 2019)

Murch, R. S. and D. DiEuliis. 2019. Guest Editors. Mapping the Cyberbiosecurity Enterprise. Invited Research Topic Special Collection. Frontiers: Bioengineering and Biotechnology (Section on Biosafety and Biosecurity). Initiated Fall 2018, Articles published in 2019 (16 articles, 71 authors), <https://www.frontiersin.org/research-topics/8353/mapping-the-cyberbiosecurity-enterprise>

Duncan, S.E., R. Reinhard, R. C. Williams, A. F. Ramsey, W. Thomason, K. Lee, N. Dudek, S. Mostaghimi, E. Colbert and R. S. Murch. 2019. Cyberbiosecurity: A New Perspective on Protecting U.S. Food and Agricultural System. In: Research Topic “Mapping the Cyberbiosecurity Enterprise” Front. Bioeng. Biotechnol. | doi: 10.3389/fbioe.2019.00063

Richardson, L., N. Connell, E. Pauwels, S. Lewis and R. S. Murch. 2019. Cyberbiosecurity: a call for cooperation in a new threat landscape. Front. Bioengin. Biotech. In: Research Topic “Mapping the Cyberbiosecurity Enterprise” Front. Bioeng. Biotechnol. doi: 10.3389/fbioe.2019.00099

Study Committees and Reports of the National Academies & National Research Council, and Organizing Committees:

- Committee Member and Contributor (Biology Panel), “Seizing the Moment: An Assessment of Research and Development Needs for Countering Terrorism”, National Academy of Sciences, January – May 2002, Published as: “Making the Nation Safer: Science and Technology for Countering Terrorism”, June, 2002

- Member and Contributor, Institute of Medicine, National Research Council, Committee on Advances in Technology and the Prevention of Their Application to Next Generation Biowarfare Threats, 2004 – 2006 (begun while employed at the Institute for Defense Analyses); Published as “Globalization, Biosecurity and the Future of the Life Sciences”, pre-publication version issued January 31, 2006, print version May 2006
- Member and Contributor, National Academy of Sciences, National Research Council, Committee on Identifying the Needs of the Forensic Science Community, 2007 – 2009; Report Published as “Strengthening Forensic Science in the United States: A Path Forward”, February 18, 2009
- Committee Member and Contributor, National Academy of Sciences, National Research Council, 2008 – 2010, Report Entitled “Nuclear Forensics: A Capability at Risk”, National Academies Press, Washington, DC, 2010
- Committee Member and Contributor, National Academy of Sciences, National Research Council, 2012. Report Entitled “Determining Core Capabilities in Chemical and Biological Defense Science and Technology”, September 10, 2012
- Organizing Committee Member, NRC Disasters Roundtable, International Workshop: “An All-of-Government Approach to Increase Resilience for International CBRNE Events: A Workshop”, Washington, DC, June 2013
- Consulting Subject Matter Expert and Keynote Speaker, “Science Needs for Microbial Forensics: Developing an International Science Roadmap”, Organized by the U.S. National Academies, the UK Royal Society and the Croatian Academy of Sciences and Arts, Zagreb, Croatia, October 2013
- Organizing Committee, U.S. National Academies – Indian National Academy of Science, Leadership Workshop on Science and Technology for Countering Terrorism. Bangalore, India, Planned for February, 2014
- Organizing Committee, National Academy of Sciences, Workshop on Applications of Advancing Technologies in the Life Sciences Research Enterprise and Their Implications for Scientific Conduct and Security. Washington, DC, Planned for May 2014
- Review Group, Division of Earth and Life Studies, National Academy of Sciences, Review of the Board of Life Sciences, Board of Environmental Studies and Toxicology and Board of Chemical Sciences and Technology, January – June 2016

- Organizing Committee, National Academy of Sciences, Workforce Development in Forensic Sciences, Washington, DC. July, 2016
- Review Coordinator for the National Academy of Sciences, “Defense in the Age of Synthetic Biology”, Board on Chemical Sciences and Technology and the Board of Life Sciences, November 2016 – March 2018

### **SELECTED PUBLIC PRESENTATIONS**

Budowle, B. and R. S. Murch. 1985. Isoelectric Focusing of Phosphoglucomutase Allozymes: Further Modifications. Presented at the American Chemical Society Spring Meeting, Miami Beach, FL.

Gambel, A. M., B. Budowle and R. S. Murch. 1986. Alpha-1-antitrypsin (Pi) Phenotyping by Ultrathin Layer Isoelectric Focusing. Presented at the Electrophoresis Society-Americas Branch Meeting, Gaithersburg, MD

Budowle, B. and R. S. Murch. 1986. Workshop in Novel Ultrathin Layer Isoelectric Focusing Methods. Presented at the Electrophoresis Society-Americas Branch Meeting, Gaithersburg, MD

Murch, R. S. and A. M. Gambel. 1986. A Double Origin Method for the Electrophoresis of Adenosine Deaminase, Adenylate Kinase and Carbonic Anhydrase II. Presented at the American Academy of Forensic Sciences National Meeting, New Orleans, LA

Schanfield, M. S., R. F. Renne, W. D. Robinson, R. P. Spalding and R. S. Murch. 1986. Physical Evidence of Maternity in Cases of Child Abandonment. Presented at the American Academy of Forensic Sciences National Meeting, New Orleans, Louisiana, and the Regional Meeting of the Southern Association of Forensic Scientists, Lexington, KY

Budowle, B. and R. S. Murch. 1986. Forensic Applications of Electrophoresis: Theory and Practice. Plenary lecture presented at the Southern Association of Forensic Scientists, Lexington, KY

Budowle, B., R. S. Murch and F. S. Baechtel. 1988. Methods for the Recovery of DNA from Liquid Blood and Bloodstains. Presented at the American Academy of Forensic Sciences National Meeting, Philadelphia, PA

Budowle, B., F. S. Baechtel and R. S. Murch. 1988. Forensic Applications of Variable Number Tandem Repeat DNA probes. Presented at the American Academy of Forensic Sciences National Meeting, Philadelphia, PA

Budowle, B., F. S. Baechtel, H. A. Deadman and R. S. Murch. 1988. DNA Typing in the FBI Laboratory. Presented at the Semiannual Meeting, Mid-Atlantic Association of Forensic Scientists, Virginia Beach, VA

Murch, R. S. 1988. Applications of DNA technology in the FBI Laboratory. Plenary lecture delivered at the Southern Association of Forensic Scientists, Memphis, TN

Cleary, K. C., C. Angle and R. S. Murch. 1995. Autonomous Robotics for Law Enforcement Operations. Presented at the International Symposium, Office of National Drug Control Policy, Nashua, NH

Murch, R. S. 1995. Recent Advances at the FBI Laboratory. Presented at the First Symposium of the Japanese Association of Science and Technology for Investigation, Tokyo, Japan.

Richardson, D. C. and R. S. Murch. 1996. Response to Nuclear, Biological and Chemical incidents by the FBI Laboratory. Presented at the 14<sup>th</sup> Meeting, International Association of Forensic Sciences, Tokyo, Japan

Murch, R. S. 1996. Chair, Symposium 6: Organization and Management of Forensic Science Laboratories. 14<sup>th</sup> Meeting, International Association of Forensic Sciences, Tokyo, Japan

Murch, R. S. 1996. Invited Panelist, Symposium: Utilization of Scientific Evidence in the Courtroom. 14<sup>th</sup> Meeting, International Association of Forensic Sciences, Tokyo, Japan.

Murch, R. S. 1996. FBI Laboratory: Program in Hazardous Materials Response. Presented at the Genetics Consortium (GENCON) Conference on Bioterrorism. Washington, D. C.

Murch, R. S. 1997. Developments in the FBI Laboratory's Hazardous Materials Response Program. GENCON Conference on Bioterrorism. Washington, D. C.

Murch, R. S., D. C. Richardson and D. L. Wilson. 1997. Hazardous Materials Response Initiatives at the 1996 Olympic Games. Presented at the American Academy of Forensic Sciences National Meeting. New York, NY

Murch, R. S., D. C. Richardson and D. L. Wilson. 1997. Hazardous Materials Response Initiatives by the FBI Laboratory. Presented at the Northwest Association of Forensic Scientists. Missoula, MT

Murch, R. S. 1998. Regaining Public Confidence in Crime Laboratories: The FBI Laboratory and the investigation of the Office of the Inspector General. Invited plenary presentation, American Academy of Forensic Sciences National Meeting, San Francisco, CA

Murch, R. S. 1998. Forensic Science and Bioterrorism. Invited keynote address, Disaster '98 Conference, Florida College of Emergency Medicine, Orlando, FL

Murch, R. S. 1998. The FBI Laboratory's Role in Response to Biological Terrorism. Invited symposium speaker, International Conference on Emerging Infectious Diseases, Sponsored by the Centers for Disease Control and Prevention. Atlanta, GA

Murch, R. S. 1998. The Future of Forensic Sciences: Embracing Change. Invited presentation at the 16<sup>th</sup> European Re-Training Conference of the FBI National Academy, Helsinki, Finland.

Murch, R. S. 1998. Scientific Tools for Bioterrorism Investigation and Response. New York Academy of Science and GENCON Combined Conference on the Surveillance, Intervention and Control of Pathogens of Global Importance to Agriculture and Food Security. Washington, D. C.

Murch, R. S. 1998. Advancement and Future of Forensic Science in the FBI Laboratory. Invited special seminar, John Jay College of Justice. New York, NY

Murch, R. S. 1999. Bioterrorism and Food Safety: FBI Laboratory Programs and Responsibilities. GENCON Conference on Bioterrorism and Food Safety for Government and Industry. Arlington, VA

Murch, R. S. 1999. Challenges of Quality Assurance in the Forensic Laboratory. Invited plenary speaker, American Association of Forensic Sciences National Meeting. Orlando, FL

Murch, R. S. 1999. The FBI Laboratory: Looking at the Present and the Future. Commemorative address, 50<sup>th</sup> Anniversary of the National Research Institute of Police Science, Kashiwa City, Japan.

Murch, R. S. 1999. The Strategic Plan and Research and Development Program of the FBI Laboratory. Invited plenary address, Japan Association of Science and Technical Investigation National Meeting. Tokyo, Japan.

Murch, R. S. 1999. The New Ecology of Quality Assurance. Invited presentation at the 1<sup>st</sup> International Symposium on Quality Assurance and



Statistics, Co-sponsored by the FBI Laboratory and the Texas Department of Public Safety. San Antonio, TX

Murch, R. S. 2000. Panel Co-chair and Organizer, Symposium on Homeland Defense. Sponsored by the RAND Corporation. Santa Monica, CA

Murch, R. S. 2000. Response, Investigation and Surveillance. Invited speaker, American Chemical Society Congressional Luncheon. The Capitol, Washington, D. C.

Murch, R. S. 2000. DTRA's Roles and Responsibilities in Counterterrorism. Presented at the Annual Conference of the Security Affairs and Support Association, Langley, VA

Murch, R. S. 2000. The Future of Forensic Biology. Invited presentation to the faculty of the Roger Williams Law School, Providence, RI

Murch, R. S. 2000. Forensic Perspectives for Nuclear Terrorism. Presented to the Defense Science Board, Panel on Unconventional Nuclear Warfare, Washington, D. C. and Irvine, CA

Murch, R. S. 2001. Bioterrorism: threats and responses, FBI and DTRA perspectives. Invited lecture to the School of Public Health, University of California at Los Angeles

Murch, R. S. 2001. Perspectives on Threats, Operations, Science and Technology Response, and Investments against Agricultural Bioterrorism. Invited presentation to the National Research Council, Panel on Agricultural Bioterrorism, Washington, DC

Murch, R. S. Invited speaker and panel chair, Gordon Research Conference: "Illicit Substance Detection: Biological and Chemical Agents", Mount Holyoke College, South Hadley, MA. June 25-27, 2001

Murch, R. S. 2001. Forensic Investigators: Challenges and Opportunities in Biosafety and Biosecurity. Eagleson Lecture, American Biological Safety Association Annual Conference. New Orleans, LA

Murch, R. S., 2002. Science and Technology Needs from the Science "Warfighter's" View. Presentation at the National Science Foundation Principal Investigator's Meeting on Sensors, Arlington, VA

Murch, R. S. 2002. Science, Technology and National Security in the New World. Invited presentation to Lawrence Berkeley National Laboratory, Berkeley, CA

- Murch, R. S. 2002. Co-Chair, Co-Organizer and Session Chair, Gordon Research Conference on “New Frontiers for Biological and Chemical Terrorism Defense”, 10 – 15 March, Ventura, CA
- Murch, R. S. 2002. Panel Member, “Free Flow of Scientific Data and National Security”, Presentation to Council of Scientific Society Presidents National Meeting, May 6, 2002, Washington, D. C.
- Murch, R. S. 2002. FBI Perspectives on Novel Robotics. Presentation at IEEE National Meeting, Workshop on Robotics. May 16, 2002, Alexandria, Virginia
- Murch, R. S. 2003. “Communicating Science While Protecting the Public”. American Institute of Biological Sciences National Meeting, March 16, 2003, Arlington, VA
- Murch, R. S. 2003. “Communicating Science While Protecting the Public” Presentation at American Phytopathological Society National Meeting, Charlotte, NC, August 2003
- Murch, R. S. 2004. Challenges for the Forensics and Attribution of Biological Weapons. Presentation at the Conference on Bioterrorism Countermeasures: Requirements and Opportunities, George Washington University, Washington D.C., March 2004
- Murch, R. S. 2004. Microbial Forensics Capability and Gap Analysis through Scenarios. Presentation at the Department of Homeland Security Meeting on Microbial Forensics, Cold Spring Harbor, NY, April 2004
- Murch, R. S. 2004. Terrorism baseline: survival, science and technology. Presentation at the National Academy of Engineering – Radio and Television Producers Association Conference on The Media and Terrorism for the Department of Homeland Security, Chicago, IL, August 2004
- Murch, R. S. 2004. Challenges and opportunities for the forensics and attribution of biological weapons. Invited Plenary Seminar, University of Medicine and Dentistry of New Jersey, Newark, NJ
- Murch, R. S. 2005. Microbial forensics. Invited Presentation at Oklahoma State University, Stillwater. February 2005
- Murch, R. S. and T. Leighton. 2005. Microbial forensics: seeking attribution through an adaptive, integrative approach. Invited Presentation at the American Chemical Society National Spring Meeting, San Diego, CA, March 14, 2005

Murch, R. S. 2005. Invited remarks on “What Future for the Biodefense Industry and Science and Technology?” At “Countering Bioterrorism: How Can Europe and the U.S. Work Together?” Conference sponsored by the New Defence Agenda and the Chemical Biological Arms Control Institute, Brussels, Belgium, April 25, 2005

Murch, R. S. 2006. Engaging the Operational National Security Agencies. Presentation to the Committee on Science, Technology and the Law. Presentation to the Ad Hoc Committee on Seeking Cooperation between Science and Security, National Research Council, January 13, 2006, Washington, D.C.

Murch, R. S. and J. P. Fitch. 2006. Clear and Present Danger: Understanding and Responding to WMD Latency, Report of the Bio Group. Presentation to workshop hosted by the Center for Global Security Research, Lawrence Livermore National Laboratory, January 19-20, 2006, Livermore, CA

Murch, R. S. 2006. A Sharp Turn in Life: Public Service and Leadership Opportunities Find a Young Academic. Invited Presentation at the Kickoff Conference for the Garfield Institute of Public Leadership, Hiram College, January 30, 2006, Hiram, OH

Murch, R. S. 2007. Attribution, Latency and Future Adventures. Invited Presentation to the Intelligence Studies Group, Department of History, Cambridge University, UK, January 19, 2007

Murch, R. S. 2007. BW Forensics and Attribution: Science and Practice. Invited Presentation to the University of Pittsburgh Medical Center, Center for Biosecurity, January 25, 2006, Baltimore, MD

Murch, R. S. 2007. Invited Panel Speaker, “The Threat of Bioterrorism and Pandemics since 9/11: How to Improve North American Cooperation”, American University, Center for North American Studies, April 2, 2007, Washington, DC

Murch, R. S. 2008. Invited Keynote Speaker, “History, Strategy and Future of Microbial Forensics” at Microbial Forensics: The Nexus between Science, Public Health and Law Enforcement, an AAAS-NAS Workshop, January 24, 2008 at Washington, D. C.

Murch, R. S. 2008. Bioterrorism: Investigation and Prosecution—Anthrax 2001 and Beyond. Invited presentation at the Wilton Park Conference 928, Counterproliferation of Biological Threat Agents, October 27, 2008.

Murch, R. S. 2009. The NAS Report: Summary of Findings and Recommendations. Presentation at *Actual Innocence*, Organized by the Center for American and International Law, Austin, TX, March 18 – 20, 2009

Murch, R. S. 2009. After the NAS Report: An 80,000 Foot View. Presentation at *Actual Innocence*, Organized by the Center for American and International Law, Austin TX, March 18 – 20, 2009

Murch, R. S, 2009. The Future of the Other Side of Biosecurity. Presentation at *Biopreparedness: Issues in Biowarfare and Pandemic Response*, 5<sup>th</sup> Annual San Diego Health Policy Conference of the Institute of Health Law Studies, California Western School of Law, San Diego, CA, March 27, 2009.

Murch, R. S. 2009. The NAS *Strengthening Forensic Science* Report. Conference on New Technologies for Law Enforcement, National Institute of Justice, Kansas City Missouri, April 2009

Murch, R. S. 2009. Science for Law Enforcement and Intelligence Attribution. Invited Presentation at *2009 Monterey Proliferation Seminar, Proliferation Complexity: The Intersection of Policy, Operations, Media, Intelligence and Science*. Organizer: Center for Contemporary Conflict, U.S. Naval Postgraduate School, Monterey, CA. July 7 – 9, 2009

Murch, R. S. 2009. Integrating Investigation, Intelligence, Science, Law, Operations and Policy for Effective WMD Attribution. Invited Presentation at the Program on Nuclear Issues, San Diego, CA, August 6 – 7, 2009

Murch, R. S. 2009. Looking Beyond the NAS Report: Improving the Quality, Reliability and Credibility of the Science. Invited Presentation at *Actual Innocence: Establishing Innocence or Guilt, Forensic Science—Friend or Foe to the Criminal Justice System*. Organized by the Center for American and International Law, Plano TX, August 17-18, 2009

Murch, R. S. 2009. Sensors and Sensor Networks: How “Operators” See and Use Them, Presentation to the Advisory Committee, Division of Earth and Life Sciences, National Academies and National Research Council, October 2, 2009

Murch, R. S. 2009. Forensic Science and Weapons of Mass Destruction. Invited presentation at the University of Pittsburgh Center for National Preparedness, November 5, 2009

Murch, R. S., R. McCreight and J. L. Smith. 2009. Microbial Forensics: Where We Are and Where We Need to Be. Co-panelists, Monthly Biosecurity

Discussion Group, American Association for the Advancement of Science, Washington, D.C. November 9, 2009

Murch, R. S. 2009. Integrating Investigation, Intelligence, Science, Law, Operations and Policy for Effective WMD Attribution. Invited Presentation at the Program on Nuclear Issues, Program on Nuclear Issues (PONI) Capstone Conference, Strategic Command (STRATCOM), Omaha NE, December 15, 2009

Murch, R. S. 2010. Microbial Forensics: Sampling But From a Broader Context. Invited Presentation at the Technical Cooperation Program (TTCP), Joint US DoD DTRA-UK MOD Dstl Meeting, Porton Down, UK, March 8 – 9, 2010

Murch, R. S. 2010. Nuclear and Bio Forensics: Focus on FBI and DHS. Invited Presentation at the Center for Strategic and International Studies, Program on Nuclear Issues, Nuclear Scholars Program, March 26, 2010

Abbott, L., M. Hsiao, E. Fox, R. Murch, B. Budowle, N. Short and S. Misra. 2010. Toward a Quantitative Basis for Sufficiency in Friction Ridge Pattern Detail. Presented at the 95<sup>th</sup> Annual International Educational Conference, International Association for Identification, Spokane WA July 2010

Murch, R. S. 2010. Exploring an International Microbial Forensics Capability to Support Attribution and Advance Global Biosecurity. Invited Presentation at the Biological Weapons Convention Experts Meeting, Geneva, Switzerland, August 26, 2010

Murch, R. S. 2010. The Future of NIST in Advancing Positive Change in the U.S. Forensic Enterprise: Policy Considerations. Invited Presentation to the Director, National Institute of Standards and Technology and Visiting Council of Advisors on Technology, October 14, 2010, Gaithersburg MD

Murch, R. S. 2010. Exploring an International Microbial Forensics Capability to Support Attribution and Advance Global Biosecurity. Invited Presentation at “Trends in Science and Technology for the Biological Weapons Convention”, To be held at the Chinese Academy of Sciences, Beijing, China, October 31 – November 2, 2010

Murch, R. S. 2010. The Challenges of New Technology: A Discussion. Invited Presentation, Cold Spring Harbor Workshop on Microbial Forensics, November 6 – 9, 2010.

Swienton, A. R., R. S. Murch and B. Budowle. 2011. A Strategic Approach to Improving Forensic Science Performance: Sufficiency as an Example.

Presented at the American Academy of Forensic Sciences, National Meeting, Chicago IL, February 25, 2011

Murch, R.S. 2011. Microbial Forensics and Attribution. Invited Presentation at the NATO Conference on WMD Attribution, Prague, Czech Republic, January 31 – February 5, 2011

Murch, R. S. 2011. Microbial Forensics: A New Program to Advance Biological Threat Reduction and Cooperative Biological Engagement? Presented at the Defense Threat Reduction Agency, Biological Threat Reduction/Cooperative Biological Engagement Science Review, Garmisch Germany March 17, 2011

Murch, R. S. 2011. Exploring an International Microbial Forensics Capability to Support Attribution and Advance Global Biosecurity. Invited Presentation at “Countering Biological Threats: Multinational Response & Bioterror Response, Implementation of the BWC”, Regional Conference Organized and Supported by the US European Command, the US Department of Health and Human Service, and the Government of Georgia. Tbilisi, Georgia May 17 – 20, 2011

Murch, R. S. 2011. “Culture of Responsibility” Movement in the Life Sciences. Invited Presentation to the American Physical Society Board, June 3, 2011

Murch, R. S. 2011. Microbial Forensics, Attribution and Global Biosecurity. Presentation at the National Academy of Sciences – UK Royal Society International Conference Planning Meeting, London, UK, June 29, 2011

Murch, R. S. 2011. Exploring an International Microbial Forensics Capability to Support Attribution and Advance Global Biosecurity. Presentation at King’s College London, Department of War Studies, London UK, June 30, 2011

Murch, R. S., N. Gahn, K. Blue, D. Cotton, C. Bourque and A. R. Swienton. 2011. The NAS Report Two Years Later: Where Are We Now? Presented at the International Association for Identification Education Conference, Milwaukee, WI, August 9, 2011

Budowle, B., R. S. Murch and A. R. Swienton. 2011. A Strategic Approach to Improving Forensic Science Performance: Sufficiency as an Example. Presented at the International Association for Identification Education Conference, Milwaukee, WI, August 11, 2011

Murch, R. S. 2012. Microbial Forensics in the Context of Science, Operations, Policy and Law. Invited Presentation to the Committee on Science, Technology and Law, National Academy of Sciences. March 26, 2012

Murch, R. S. 2012. Microbial Forensics in the Context of Science, Operations, Policy and Law. Invited Presentation to the Royal Society, Committee on Science and International Security, London, UK. April 16, 2012.

Murch, R. S. 2012. Invited Panelist, “Forensics: Science Policies to Increase Confidence”, American Chemical Society’s Science and the Congress Project, U.S. Capitol, Washington, D.C. September 26, 2012

Murch, R. S. 2012. Invited Panelist, “Biosecurity: Confronting Existing and Emerging Unknowns”, American Chemical Society’s Science and the Congress Project, Science and Society: Global Challenges Discussion Series, Co-Sponsored by the American Association for the Advancement of Science and Georgetown University’s Science in the Public Interest Program. AAAS Headquarters, Washington, D.C. October 1, 2012.

Murch, R. S. 2013. The Trajectory of Microbial Forensics: From Origins to Grand Challenges. Presented at “Science Needs for Microbial Forensics-Developing An International Roadmap”. An International Workshop Sponsored and Organized by the U.S. National Academies, UK Royal Society and Croatian Academy of Sciences and Arts, Zagreb, Croatia, October 13 – 16, 2013

Murch, R. S. 2013. Designing an Effective Microbial Forensics Program for Law Enforcement and National Security. Presented at “Natural or Deliberate Outbreak-How to Prevent or Detect and Trace Its Origin: Biosecurity, Surveillance, Forensics”. An International Workshop Organized by the Polish Academy of Sciences, The Polish Military Institute of Hygiene and Epidemiology and the Polish Ministry of Foreign Affairs. Warsaw, Poland, December 6, 2013

Murch, R. S. 2014. Achieving “Who Did It? The Forensics and Attribution of Biological Weapons”. Virginia Tech-National Capital Region, S&T Leaders Lecture, May 8, 2014

Murch, R. S. 2014. Integrating Microbial Forensics and Attribution into the Military Response to the Biological Event. EpiMilitaris, Ryn, Poland, October 13 – 16, 2014

Murch, R. S. 2015. Forensic Science and Microbial Forensics in Bioterrorism and Bioproliferation Investigations. Center for Middle East Development 2015 Conference, Prague, Czech Republic, February 20, 2015

Murch, R. S., C. Bidwell and J. Lauder. 2015. Bioattribution Scenario Workshop. Center for Middle East Development 2015 Conference, Prague, Czech Republic, February 20, 2015

Murch, R. S. 2015. Attribution. Presented to the Blue Ribbon Study Panel on Biodefense, Former Governor and Homeland Security Secretary Tom Ridge and Former Senator Joe Lieberman, co-chairs. Session 3, Meeting Site: Hudson Institute, Washington, D.C. March 12, 2015.

Murch, R. S. 2015. "Science in Crisis", Panelist for the Division of Earth and Life Studies Advisory Committee Event, May 20, 2015

Murch, R. S. 2015. Science Supporting Attribution in the BWC Context. Presented to the BWC Experts Group Conference, Geneva, Switzerland. August 12, 2015

Murch, R. S. 2015. Science Supporting Attribution in the Global or Regional Contexts. Center for Middle East Development (CMED) Conference, Prague, Czech Republic. August 19, 2015

Murch, R. S. 2015. Considerations for Implementing a Global or Regional Microbial Forensics Capability. Center for Middle East Development (CMED) Conference, Prague, Czech Republic. August 21, 2015.

Murch, R. S. 2016. Suspicious Events: A Brief Look from the Operational Perspective. Chemistry in Security Special Event, American Chemical Society Webinar, February 9, 2016, from Washington, D.C.

Murch, R. S. 2016. Panel Moderator, Chemical and Biological Defense, University of Virginia Advanced Research Institute Conference on National Defense and Intelligence, Charlottesville, VA, June 13 – 14, 2016

Murch, R. S. 2017. Microbial Forensics Bioterrorism/Biosecurity Investigations, Cyberbiosecurity Will Protect Bioprocess Development and Biomanufacturing. Presented at the Oxford Global "Genetics in Forensics" Conference, London UK, March 14, 2017

Murch, R. S. 2017. Strategy of Intelligence. Presented at the NATO Advanced Research Workshop "Defence Against Bioterrorism: Methods for Prevention and Control". Also Panel Chair. March 16–17, 2017, Belgrade, Serbia.

Murch, R.S. 2017. Designing an Effective Microbial Forensics Capability for Law Enforcement and National Security Purposes. Invited Keynote Lecture (Recorded). Presented to the Microbiology Department, University of the Philippines at Los Banos, March 20, 2017



Murch, R. S. 2017. Microbial Forensics and Cyberbiosecurity: The Two Could be Connected. Presented at the University College London 11<sup>th</sup> Annual International Crime Science Conference, July 11, 2017, London, UK

Murch, R. S. 2017. Forensics Informs Answers to Key Questions and Supports Critical Decisions. NCT USA: A Vision of IB Consultancy and the CBRNe Society. September 19 – 21, 2017, Dulles, Virginia

Murch, R. S. 2017. Organizer and Presenter, Workshop on Securing the Bioeconomy: Cyberbiosecurity, Virginia Tech Research Center, Arlington VA, October 4 – 5, 2017. First-ever event to organize a community of interest and plan the strategic future of cyberbiosecurity, a new discipline and possible national and international enterprise.

Murch, R. S. 2017. Strategy of Intelligence. 1<sup>st</sup> Congress of the Croatian Biosafety and Biosecurity Association, Zagreb, Croatia, December 7 – 9, 2017

Murch, R. S. 2017. Cyberbiosecurity: A New Discipline and Enterprise Under Construction. 1<sup>st</sup> Congress of the Croatian Biosafety and Biosecurity Association, Zagreb, Croatia, December 7 – 9, 2017

Murch, R. S. 2017. Cyberbiosecurity: A New Discipline and Enterprise Under Construction. Invited Presentation at Josip Juraj Strossmayer University of Osijek, Osijek, Croatia, December 12, 2017

Murch, R. S. 2018. Cyberbiosecurity: A New Discipline and Enterprise Under Construction. Webinar for the American Biosafety Association “Biosecurity Challenges for Developing Technologies: Genomic Methods and Digital Technologies”. January 17, 2018

Burnette, R. N. and R. S. Murch. 2018. Biosecurity Frameworks at the Convergence of the Bio-Economy. Part II: Biosecurity Risk & Threat Management Frameworks at the Convergence of the “Bio”-economy. Webinar for the American Biosafety Association. August 29, 2018

Murch, R. S., K. Sixt, J. Grotte and M. Sloane. 2018. Invited Panel Presentation, Cyberbiosecurity: What Does It Mean for the Department of Defense. US Special Operations Command – Defense Threat Reduction Agency, Countering Weapons of Mass Destruction Coordination Conference, Ft. Belvoir, VA, September 18, 2018

Murch, R. S. 2018. Cyberbiosecurity Protects National Security and the Bioeconomy. 2018 Intelligence and Cybersecurity Conference, The Citadel (Military University of South Carolina), Charleston SC, September 25 – 26, 2018

Murch, R. S. 2018. Origins and Future of the Forensics and Attribution of Biological Threats and Events. Invited Remarks, at “Fits and Starts: Reactionary Biodefense”, Blue Ribbon Study Panel on Biodefense, Hudson Institute, Washington, D.C. October 9, 2018.

Murch, R. S. 2018. Cyberbiosecurity: An Emerging New Discipline with Numerous Applications and Opportunities. Invited Presentation, Pacific Northwest National Laboratory, Richland, Washington. October 11, 2018.

Murch, R. S. 2019. Cyberbiosecurity: A New Security “Ecosystem”. Panel Organizer, Chair and Presenter. American Society for Microbiology, “Biothreats 2019”, Arlington VA, January 29, 2019

Murch, R. S. 2019. Security Vulnerabilities in the Bioeconomy Existed Prior to Synthetic Biology. Presentation for Public Session #3 of National Academies of Science, Engineering and Medicine Study Committee “Safeguarding the Bioeconomy: Finding Strategies for Understanding, Evaluating, and Protecting the Bioeconomy while Sustaining Innovation and Growth”, Washington, DC, May 1, 2019

Murch, R, 2019. Security Vulnerabilities in the Bioeconomy Existed Prior to Synthetic Biology. Presentation to the National Materials and Manufacturing Board of the National Academies of Science, Engineering and Medicine, Washington, DC, May 1, 2019

Murch, R. S. 2019. Cyberbiosecurity: A New and Emerging Security Paradigm. Presentation to the 8<sup>th</sup> International Symposium on Microbial Forensics. Ottawa, Canada, June 6, 2019

Numerous other informal and formal, presentations, lectures and briefings on science and technology research and development and applications for law enforcement, counterintelligence, counterterrorism; forensic science; FBI Laboratory operations, science, research and development, and engineering development and applications; weapons of mass destruction threat reduction, biosecurity and cyberbiosecurity. Audiences have been local, state and Federal law enforcement, prosecution and scientific agencies, U.S. and international forensic laboratory managers and scientists, civic organizations, academic institutions, professional societies, Department of Energy National Laboratories, FBI management (all levels, including the Director, FBI), Department of Defense, Intelligence Community, Executive Branch agencies, U.S. Congress (including formal testimonies), the National Research Council, National Academy of Sciences and National Academy of Medicine, and friendly foreign governments. 1980 – Present

## **PROFESSIONAL MEMBERSHIPS, BOARDS AND COMMITTEES**

- Member, American Academy of Forensic Sciences, 1984-1988, 1997-1999
- Member, American Society of Crime Laboratory Directors, 1996-2001
- Member, Board of Directors, American Society of Crime Laboratory Directors, 1997-2000
- Member, U.S. Department of Justice (DOJ) Technology Policy Council, 1997 – 1999
- Member, Advisory Board, National Center for Forensic Sciences, University of Central Florida, Orlando. 1997-1999
- Member, National Institute of Justice DNA Proficiency Testing Panel, 1996-1998
- Designated Federal Employee, DNA Advisory Board, 1996 – 1999
- Chair, FBI Institutional Review Board (Human Subjects Testing), 1998 –1999
- Member, Executive Council, Departments of Defense-Energy-State Technical Support Working Group (TSWG), 1998-1999, 2002
- Senior Advisor, Defense Threat Reduction Agency (DTRA), 2001- 2002
- Member, National Advisory Committee, Center for Public Health Preparedness, Mailman School of Public Health, Columbia University, 2001- 2002, 2004 - 2005
- Member, DOJ Wireless Communications Board, 2001- 2002
- Member (FBI Seat), Threat Reduction Advisory Committee (TRAC, DTRA Council of Senior Advisors) 1999-2001; Member, Defense Science Board and TRAC Subject Area Panels, 2001 - 2009
- Intelligence Community Senior Advisory Committees, 2002 – 2004
- Advisory Committee, Gordon Research Conferences, 2003 – 2005

- Member, U.S. Northern Command – North American Aerospace Defense Command Independent Strategic Advisory Group (N2-ISAG), 2003
- Member, Scientific Working Group for Microbial Genomics and Forensics, 2003 - 2006
- Member, Board of Life Sciences, National Research Council 2003 – 2009 (two consecutive three-year terms)
- Member, BioChem 2020 (Senior Scientific Advisory Board), Department of Defense, 2004 - 2013
- Member, Committee on Biodefense Analysis and Countermeasures, National Research Council. Standing Committee for the National Biodefense Analysis and Countermeasures Center and the Office of Research and Development, Department of Homeland Security, 2005 – 2006
- Member, President’s Advisory Council, Research Corporation, Tucson, AZ, 2005 – 2006, 2008 - Present
- Member, American Association for the Advancement of Science (AAAS), 1974-1980, 1984 – 1988, 1999 – Present
- Member, American Society for Microbiology, 2003 – Present
- Member, American Phytopathological Society, 1974 – 1979, 2005 - 2007
- Member, New York Academy of Sciences, 2005 – 2008
- Member, National Research Council Standing Committee on Research, Development and Acquisition Options for the U.S. Special Operations Command, 2008 - 2009
- Member, Task Force “Leveraging National Laboratory S&T Assets for the 21<sup>st</sup> Century”, Commissioned by the Department of Energy, National Nuclear Security Administration, administered by the Henry L. Stimson Center, Washington, D.C. 2008 – 2009
- Member, American Bar Association, Section on Science, Technology and the Law, and Committee on the Future of Forensic Evidence, 2009 – 2010

- Member, National Science Advisory Board for Biosecurity, National Institutes of Health, Department of Health and Human Services, December 2009 – April 2012
- Member, Division of Earth and Life Sciences Advisory Committee, National Research Council, January 2010 – December 2015 (two three-year terms)
- Co-Chair, Microbial Forensics Working Group, Department of Defense, on behalf of the Assistant to the Secretary for Nuclear, Chemical and Biological Programs, Office of the Undersecretary of Acquisition, Technology and Logistics. 2010 – 2011
- Member, Interagency Microbial Forensics Advisory Board, Organized by the Office of Science and Technology Policy (OSTP), Executive Office of the President, 2010 – 2014, Representing the Department of Defense
- Associate Editor, Frontiers in Bioengineering and Biotechnology: Section on Biosafety and Biosecurity, Nature Publishing Group, Lausanne, Switzerland, 2014 –
- Member, Two US Government National Security Advisory Boards, 2017 - Present

### **MILITARY EXPERIENCE**

- United States Army Reserve Officers Training Corps (ROTC), University of Illinois, 1977-1979 (Outstanding Military Student)
- U.S. Army Air Assault School, Ft. Campbell, Kentucky, 1978
- Commissioned 2<sup>nd</sup> Lieutenant, U. S. Army Reserve (Military Police Corps), 1979
- Military Police Corps Officer Basic Course, Ft. McClellan, Alabama, July-October 1979
- Commission relinquished by regulation upon hiring by the FBI in January 1980, due to designation as “Key Federal Employee”

### **AWARDS**

- FBI Senior Executive Service Merit Bonuses, 1997 and 1998
- Office of the Secretary of Defense Award for Excellence, 2001

- Virginia Tech Merit Pay Awards, Annually
- 2018 Innocence Network Champion of Justice Award. In honor of the 10-year anniversary of the publication of the National Academies' committee groundbreaking report, Strengthening Forensic Science in the United States: A Path Forward, which has truly transformed the state of forensic science and its role in criminal justice reform. Awarded at the Innocence Network Conference, Atlanta, Georgia, April 2019

## **PERSONAL AND COMMUNITY**

- Born November 18, 1952 at San Diego, California; U.S. Citizen
- Resides in Prince William County, Virginia (near Washington, D.C.)
- Member, Sudley Club, Manassas, Virginia, 1989 – 2004 (former board member, active yearly in summer swim meet officiating 1989-2002)
- Member, Board of Directors, Benedictine Assistance to Residents and Neighbors (BARN, homeless and battered women and family shelter), Bristow, Virginia, 1999 – 2001
- Youth Travel Soccer Club, Parents Board, 1998 – 2002
- Member, Kiwanis Club of Bull Run, Manassas, Virginia, 2003 - Present, Club President 2006 – 2007
- Member, Board of Directors, Caton Merchant House (Assisted Living Facility), Novant – University of Virginia Health System, Manassas VA, January 2019 - Present
- Hobbies: Exercise, Golf, Hiking, Cycling, Kayaking, Shooting, Reading