

JAYNE BILLMAYER MORROW



EDUCATION

- Ph.D.** University of Connecticut, *Environmental Engineering*, 2005
- M.Sc.** University of Connecticut, *Environmental Engineering*, 2001
- B.Sc.** Montana State University-Bozeman, *Civil Engineering*, 1998

PROFESSIONAL EXPERIENCE

- 2019-present Assistant VP Research and Economic Development, Montana State University
Leadership of the federal relations portfolio including congressional relations, federal partnerships, and applied research program growth
- 2021-present Associate Research Professor, Department of Civil Engineering, Montana State University
- 2020-present President, Integrated Bioscience and Built Environment Consortium (IBEC) a nonprofit to reduce pathogen transmission in built environments
- 2020-present Joint Appointment, Idaho National Laboratory
- 2015-2019 Senior Science Policy Advisor, National Institute of Standards and Technology
- 2013-2015 Executive Director, National Science and Technology Council, Office of Science and Technology Policy, Executive Office of the President of the United States of America
- 2008-2013 Environmental Engineer, National Institute of Standards and Technology
- 2006-2008 Post-Doctoral Fellow, National Research Council
- 2005-2006 Research Associate, National Institute of Standards and Technology
- 2004-2005 Adjunct Assistant Professor of Engineering, Smith College
- 2001-2004 GAANN Environmental Biotechnology Fellow, University of Connecticut
- 1998-2001 Research Associate, University of Connecticut
- 1993-1998 NSF Undergraduate Research Fellow, Center for Biofilm Engineering, Montana State University

COURSES TAUGHT/DEVELOPED

Designing the Future: An Introduction to Engineering, Fall 2004 (Smith College)

Undergraduate course develops a solid understanding of engineering design process through a semester-long, team-based design project at Picker Engineering Program, Smith College. Topics covered include professional responsibility, sustainable design and contemporary issues and discussions on social and cultural issues impacting in engineering design and technological innovation.

Chemical & Environmental Reaction Engineering, Spring 2005 (Smith College)

Undergraduate course covering quantitative review of physical, chemical and biological fundamentals, setting the stage for the analysis and prediction of rates of chemical and biochemical conversion in homogeneous, heterogeneous and catalytic systems. Mathematical models to describe elementary and non-elementary reactions, isothermal and non-isothermal reactor design, catalysis, non-ideal reactors, steady-state and non steady-state systems are addressed.

Bacterial Adhesion and Transport, Spring 2003 (Smith College)

Undergraduate students explored the role of surface chemistry in bacterial adhesion to various mineral surfaces in the lab section of a semester-long independent study course. Students were introduced to the fundamentals of mass transport, filtration theory, interfacial forces and surface thermodynamics while learning to review and critique peer reviewed journal articles.

Thermodynamics in Biochemical Processes, Fall 2001 (U. Connecticut)

Fundamentals of thermodynamics in biochemical processes taught over a three week long session of Quantitative Microbial Biochemistry at the Department of Molecular and Cell Biology, University of Connecticut. Graduate students study the impact of substrate utilization on microbial processes and microbial community dynamics through discussion and lectures.

Bioflocculation in Biochemical Processes, Spring 2003 (U. Connecticut)

Role of surface chemistry in bacterial cell/cell and cell/surface association was addressed in a two-week lecture/lab session of semester long Biochemical Processes course at the University of Connecticut. Florescent *in-situ* hybridization was used to identify bacterial surface-active roles in floc formation. Surface thermodynamic parameters and surface charge measured for activated sludge from three wastewater treatment facilities was used to predict interaction energies as part of a term project.

Drinking Water Disinfection, Fall 2001-2003 (U. Connecticut)

Designed two-week lab course to teach drinking water disinfection reaction kinetics and chlorine chemistry to undergraduate students as part of the Unit Operations Laboratory at the University of Connecticut. Reactor design, microbial culturing techniques and disinfectant ability were evaluated utilizing *E. coli* Bacteria and T7 phage virus particles.

FIELD TRAINING EVENTS AND EXERCISES DEVELOPED/TAUGHT

1. Advisor to the **Biological Threat Response** Working Group, Training and ASTM Standards Integration, State of Georgia
2. "Sample collection and operational guidance for initial response to suspected biothreats", Bio Sampling in the Field, **IAFC International Hazardous Materials Response Teams Conference**, Baltimore, MD, May 18, 2012 (with R. Emery).
3. **Operation Vigilant Sample: Empire State Strikes Back Large-Scale Field Exercise** to demonstrate a state level response including GA CST mobilization and response to a suspicious package according to ASTM E2770 and E2458, April, 24, 2012, Ft. Detrick, MD.
4. **Operation Vigilant Sample: SC Capstone Field Exercise** to demonstrate a state level response including SC and TN CST mobilization and response to a suspicious package according to ASTM E2770 and E2458, March 19-25, 2012, Myrtle Beach, SC.
5. Sample collection and operational guidance for initial response to suspected biothreats, Bio Sampling in the Field, **HotZone 2011**, Houston, TX, October 20, 2011 (with R. Emery).

6. **Operation Vigilant Sample III Large Scale Field Exercise** to demonstrate a state level response including GA CST mobilization and response to a suspicious package according to ASTM E2770 and E2458, February 8-10, 2011, Ft. Detrick, MD.
7. Establishing a Biothreat Field Response Mission Capability, training to communicate best practices for response to a suspicious package according to ASTM E2770 and E2458, October 5, 2011, Fredricksburg, VA.
8. Integration of Operational Guidance for Initial Response to Suspected Biothreats”, **IAFC International Hazardous Materials Response Teams Conference**, Baltimore, MD, May 21, 2011 (with D. Ladd).
9. “Sample collection and operational guidance for initial response to suspected biothreats”, Bio Sampling in the Field, **IAFC International Hazardous Materials Response Teams Conference**, Baltimore, MD, May 19, 2011 (with R. Emery).
10. Sample collection and operational guidance for initial response to suspected biothreats, When a Hazmat Incident is a Crime Scene, **HotZone 2010**, Houston, TX, October 14, 2010 (with D. Mazzolini and D. Iannelli both from FBI HMRU).
11. “Sample collection and operational guidance for initial response to suspected biothreats”, Bio Sampling in the Field, **HotZone 2010**, Houston, TX, October 14, 2010 (with R. Emery).
12. Coordination in Response community and Revision of ASTM E2458 Standard Methods for Bulk and Swab Sample Collection of Visible Powders, **Sampling Summit**, San Francisco, CA, August 2, 2010.

STUDENT AND UNIVERSITY COMMITTEE SERVICE

- Student Committee, Captain Bryon Marsh, Master of Arts in Security Studies, *Implementing the National Framework for a Biothreat Field Response Mission Capability*, Naval Postgraduate School, Center for Homeland Defense and Security, September 2013.
- Student Committee, Trenton Bushmaker, *The effect of temperature and humidity on the aerosol stability of SARS-CoV-2*, Montana State University, Department of Microbiology and Immunology, Master of Science, current student.
- Wellness Task Force, Wellbeing Initiative, Graduate School, Montana State University
- Research Council, Office of the Vice President for Research, Economic Development, Graduate Education, Montana State University (non-voting member)

RESEARCH AND POLICY DEVELOPMENT EXPERIENCE

- Specialty expertise in policy development on critical S&T issues: national security, homeland security, workforce including diversity, equity and inclusion and national S&T policy development experience, leadership of interagency coordination.
- Pathogen fate and transport in complex environments, interfacial interactions, and modeling to support public health, public safety, environmental health and engineering design
- Microbial detection, diagnostics and decision making for the preservation of public health and safety, and environmental health
- Microbe/surface interfacial processes and the challenges of collecting and detecting microbes in natural (subsurface bacterial transport and microbial community adaptation dynamics) and engineered (air, surfaces, water, wastewater treatment and indoor environment) systems

FUNDED PROGRAMS AND PROJECTS

Expanding Screening Capacity to Enhance Montana’s COVID-19 Response Capabilities, Co-I with C. Chang et. al. selected for funding from the Montana Governor’s task force, Office of the Commissioner of Higher Education, (\$778,000), October – December 2020.

QUASAR- Quality Assurance for Software Analysis and Resilience, co-PI with C. Izurieta, Funded by Idaho National Laboratory, Department of Homeland Security, Science and Technology Directorate (\$ 1.5M/2 yr) December 2020 to September 2022.

Standards Development to support Material Qualification for Test and Evaluation of Biological Agent Detection Technologies, PI, Funded by the Department of Homeland Security, Science & Technology Directorate, Test & Evaluation/Standards Division (\$555 K/year) August 2012 to July 2015.

Rapid separation of microbes from complex media using cell chemotaxis, Funded by the Office of Law Enforcement Standards, NIST, co-PI with J. Atencia (\$105 K, 2-year program) August 2011-2013.

Workshop on Surface and Aerosol Sampling for the Indoor Microbiome, Funded by the Alfred P. Sloan Foundation, co-PI with J. Peccia, Yale University (\$65 K) October 17, 2010.

Standards Development for Detection and Sampling of Biothreats by First Responders, Funded by the Department of Homeland Security, Science & Technology Directorate, Test & Evaluation/Standards Division (3 year program, FY09, \$2.75 M) July 17, 2009 to current.

Advanced Neutron Radiography Imaging Technique, NIST funded Innovation Program (\$1M/yr, 5 yr program) in February 2009

Validated Sampling Methods for Biological Agents, Funded by the Department of Homeland Security, Science & Technology Directorate, Test & Evaluation/Standards Division (FY08, \$600 K) funding to be received by May 31, 2008.

Standards Program Development for Biological Countermeasures, Funded by the Department of Homeland Security Science & Technology Directorate, Test & Evaluation/Standards Division (FY06 redirected FY07, \$500 K) project technical lead since inception, began managing the project January 1, 2008.

Computer Modeling of Contamination Scenarios with Sampling Strategy Plots, Funded by the Department of Homeland Security, Science & Technology Directorate, Test & Evaluation/Standards Division (FY07, \$500 K) January 1, 2008.

PEER-REVIEWED MANUSCRIPTS

Jayne B. Morrow*, Aaron Packman, Kenneth Martinez, Kevin Van Den Wymelenberg, Darla M Goeres, Delphine Farmer, Jade Mitchell, Lisa Ng, Yair Hazi, Monica Schoch-Spana, Sandra Crouse Quinn, William Bahnfleht and Paula Olsiewski, *Critical Capability Needs for Reduction of Transmission of SARS-CoV-2 Indoors*, *Frontiers Bioeng. Biotechnol.* - Biosafety and Biosecurity, September 29, 2021, doi.org/10.3389/fbioe.2021.641599

Will Rogers, Manuel Ruiz-Aravena, Dale Hansen, Wyatt Sonoma, Maureen Kessler, Matthew Fields, Matthew Ferrari, Connie Chang, **Jayne Morrow**, Andrew Hoegh, Raina Plowright, High-frequency screening combined with diagnostic testing for control of SARS-CoV-2 in high-density settings: an economic evaluation of resources allocation for public health benefit, March 2021, DOI:[10.1101/2021.03.04.21252949](https://doi.org/10.1101/2021.03.04.21252949)

Bikos, D. A., C. Hwang, K. A. Brileya, A. Parker, E. K. Loveday, M. Rodriguez, T. LeFevre, I. Thornton, J. N. Wilking, M. Dills, S. T. Walk, A. K. Adams, R. Plowright, A. B. Hoegh, J. R. Carter, **J. Morrow**, M. Taylor, D. Keil, M. W. Fields, and C. B. Chang, SLAMP: A Rapid Fluorometric RT-LAMP Assay for Sensitive and Specific Detection of SARS-CoV-2 from Human Saliva, medRxiv 2021.03.31.21254634; doi: <https://doi.org/10.1101/2021.03.31.21254634>

Kenneth F Martinez, **Jayne B Morrow**; Lessons learned in managing risk: Tools and strategies for confident operations from the CLEAN 2020 Summit, *Toxicology and Industrial Health*, November 26, 2020 <https://doi.org/10.1177/0748233720971381>

- J. B. Morrow**, J D Ropero-Miller, M L Catlin, A D Winokur, A B Cadwallader, J L Staymates, S R Williams, J G McGrath, B K Logan, M M McCormick, K B Nolte, T P Gilson, M J Menendez, B A Goldberger; The Opioid Epidemic: Moving Toward an Integrated, Holistic Analytical Response, *Journal of Analytical Toxicology*, bky049, August 2018, <https://doi.org/10.1093/jat/bky049>.
- Olson Nathan D., Justin M. Zook, **Jayne B. Morrow**, Nancy J. Lin (2017) Challenging a bioinformatic tool's ability to detect microbial contaminants using in silico whole genome sequencing data." *PeerJ* 5: e3729.
- Da Silva, S. M., Vang, L. K., Olson, N. D., Lund, S. P., Downey, A. S., Kelman, Z., ... & **Morrow, J. B.** (2016). Evaluation of microbial qPCR workflows using engineered *Saccharomyces cerevisiae*. *Biomolecular detection and quantification*, 7, 27-33.
- Olson, N. D., Lund, S. P., Zook, J. M., Rojas-Cornejo, F., Beck, B., Foy, C., ... **Morrow, J. B.** *International interlaboratory study comparing single organism 16S rRNA gene sequencing data: Beyond consensus sequence comparisons*. *Biomolecular Detection and Quantification*, 2015, <http://doi.org/10.1016/j.bdq.2015.01.004>.
- Olson, N., Lund, S. P., Colman, R. E., Foster, J. T., Sahl, J. W., Schupp, J. M., Keim, P., **Morrow, J. B.**, Salit, M. L., Zook, J. M. (2015). Best Practices for Evaluating Single Nucleotide Variant Calling Methods for Microbial Genomics. *Frontiers in Genetics*, 6, 2015, <http://doi.org/10.3389/fgene.2015.00235>.
- Olson, N., **J.B. Morrow**, Framework for the Evaluation of DNA Extract Suitability for Identification, Quantification, and Sequencing of Unknown Microorganisms, *BMC Research Notes*, 2012, 5:668.
- Morrow, J. B.**, K. Cole, V. Reipa, Raman Spectroscopy of *Bacillus thuringiensis* *Physiology and Inactivation*, *European Physical Journal Plus*, 2012, 127:151.
- Downey, A., S. M. Da Silva, N. Olson, J. J. Filliben, **J. B. Morrow**, Impact of processing method on recovery of bacteria from wipes used in biological surface sampling, *Applied and Environmental Microbiology*, 2012, 78(16):5872-81.
- Morrow, J.**, M. Davenport, *Standards activities to support a biothreat mission capability in the United States*, Euro Reference, ANSES Publication, 2012, **ER 07**:43-44.
- Morrow, J.**, C. McGuyer, B. Marsh, D. Ladd, *Building a National Biothreat Response Capability*, Defense Standardization Program Journal, 2012, **Apr/Sept**:43-44.
- Egan, C., **Morrow, J.**, A. Fox, *Choosing Controls to Ensure Reliable Results in the Field*, *Inside Laboratory Management*, 2012, 16(1), 19-21.
- Y. Pachepsky, **J. Morrow**, A. Guber, D. Shelton, R. Rowland, G. Davies, *Effect of biofilm in irrigation pipes on microbial quality of irrigation water*, *Letters in Applied Microbiology*, 2012, 54 (3): 217-224.
- Da Silva, S. M., J. J. Filliben, **J. B. Morrow**, Role of Surface Chemistry in the Extraction of *Bacillus anthracis* Sterne from Wipe Materials, *Applied and Environmental Microbiology*, 2011, 77 (7): 2374-2380.
- Morrow, J. B.**, C. Arango, R. D. Holbrook, *Association of quantum dot nanoparticles with Pseudomonas aeruginosa biofilm*. *Journal of Environmental Quality*, 2010, 39 (6): 1934-1941.
- Dols, W. S., B. D. Matzke, L. H. Sego, **J. B. Morrow**, L. L. Nuffer, B. A. Pulsipher, A. K. Persily, Development and Demonstration of a Method to Evaluate Bio-Sampling Strategies using Building Simulation and Sample Planning Software, *Journal of National Institute of Standards and Technology*, 2010, 115(2):113-147.
- Atencia J., **Morrow J.**, Locascio L., *The microfluidic palette: A diffusive gradient generator with spatio-temporal control*. *Lab on a Chip*, 2009, 9:2707-2714.
- Morrow, J. B.** and K. Cole, Germination Enhanced Decontamination of *Bacillus* Spores in a Simulated Drinking Water System. *Environmental Engineering Science*, May 2009, 26(5): 993-1000. doi:10.1089/ees.2008.0309.
- Morrow, J. B.**, J. Almeida, L. Fitzgerald and K. Cole, *Decontamination of Bacillus anthracis spores from water systems*. *Water Research*, 2008, 42(20):5011-21.

R. D. Holbrook, K. E. Murphy, **J. B. Morrow**, K. D. Cole, *Trophic Transfer of Nanoparticles in a Simplified Invertebrate Food Web*. Nature Nanotechnology, 2008, **3**:p. 352-355.

Yang, H.-H., **Morrow, J. B.**, D. Grasso, R. T. Vinopal, A. Dechesne and B. F. Smets. Antecedent Growth Conditions Alter Retention of Environmental Escherichia coli Isolates in Transiently Wetted Porous Media. Environmental Science and Technology, 2008, **42**:9310-9316.

Yang, H.-H., **Morrow, J. B.**, D. Grasso, R. T. Vinopal and B. F. Smets. 2006. *Intestinal versus External Growth Conditions Change the Surficial Properties in a Collection of Environmental Escherichia coli Isolates*. Environmental Science and Technology, 2006, **40**(22): p.6976-6982.

Almeida, J., Wang, L., **Morrow, J. B.**, Cole, K. D. Requirements for the development of *Bacillus anthracis* spore reference materials used to test detection systems. Journal of Research of the National Institute of Standards and Technology, 2006. **111**(3): p. 1-13.

Morrow, J. B., R. Stratton, H.-H. Yang, B. F. Smets, and D. Grasso, *Macro- and Nanoscale Observations of Adhesive Behavior for Several E. coli Strains (O157:H7 and Environmental Isolates) on Mineral Surfaces*. Environmental Science & Technology, 2005. **39**(17): p. 6395-6404.

Morrow, J. B., B. F. Smets, and D. Grasso, *Perceived substratum characteristics as a function of AFM probe and imaging fluid properties*. Langmuir, 2003. **19**: p. 6151-6159.

Smets, B. F., **J. B. Morrow**, and C. Pinedo Arango, *Plasmid Introduction in Metal-Stressed, Subsurface-Derived Microcosms: Plasmid Fate and Community Response*. Applied and Environmental Microbiology, 2003. **69**(7): p. 4087-4097.

Sharp, R.R., A. B. Cunningham, J. Komlos, **J. Billmeyer**, *Observation of thick biofilm accumulation and structure in porous media and corresponding hydrodynamic and mass transfer effects*. Water Science and Technology, 1999. **39**(7): p. 195-201.

PEER REVIEWED TECHNICAL REPORTS AND FORMAL PUBLIC MEMORANDA

FY 2014 Annual Interagency Funding for Activities of the National Science and Technology Council, Report to Congress, pursuant to Public Law 113-235.

J. B. Morrow, Handbook of the National Science and Technology Council, Office of Science and Technology Policy, Executive Office of the President, Washington, DC, October 2014.

FY 2013 Annual Interagency Funding for Activities of the National Science and Technology Council, Report to Congress, pursuant to Public Law 113-235.

FY 2012 Annual Interagency Funding for Activities of the National Science and Technology Council, Report to Congress, pursuant to Public Law 113-235.

J. B. Morrow, A. Downey, J. Peccia, Challenges in Microbial Sampling in the Indoor Environment, Workshop Summary, NIST Technical Note 1737, February 2012.

Dols, W. S., A. K. Persily, **J. B. Morrow**, Model Development and Validation for Particle Release Experiments in a Two-story Office Building, NIST Technical Note 1703, October 2011.

CBRNIA Forum on Bioforensics Resources and Repositories, Battelle Eastern Science & Technology Center in Aberdeen, MD, March 31, 2010, CBRNIA Newsletter 2010, Volume 11 Number 2.

Amidan, B., G. Piepel, **J. B. Morrow**, Summary of Previous Chamber or Controlled Anthrax Studies and Recommendations for Possible Additional Studies, December 2010, *PNNL-SA-69338, Rev.1*

Morrow, J. B., G. Piepel, Summary of CDC and Canadian Studies and Discussion Points for Evaluating the Need for an Additional Chamber Study, February 2009.

Morrow, J. B., Surface Sampling of *Bacillus* Spores, April 2009, Direct-Reading Exposure Assessment Methods (D.R.E.A.M.) NIOSH Publication No. 2009-13

Dols, W. S., B. D. Matzke, L. H. Segó, **J. B. Morrow**, L. L. Nuffer, B. A. Pulsipher, A. K. Persily, Development and Demonstration of a Method to Evaluate Bio-Sampling Strategies using Building Simulation and Sample Planning Software, NIST Technical Note 1636, June 2009.

CONSENSUS DOCUMENTARY STANDARDS DEVELOPED

ASTM Standard Practice for Field Evaluation of On-Site Biological Assessment Technologies (Work Item under E54)

ASTM Standard Practice for Collection of Particulate by Wipe Sampling and Subsequent Determination of Wipe Collection Efficiency (Work Item under E54)

ASTM E2458-04, 10, 17 Standard Practices for Bulk Sample Collection and Swab Sample Collection of Visible Powders Suspected of Being Biothreat Agents from Nonporous Surfaces, DOI: 10.1520/E2458-10

ASTM E2770-04, 10, 17 Operational Guidelines for Initial Response to a Suspected Biothreat Agent, DOI: 10.1520/E2770-10

ANSI/ASB Standard 125, First Edition 2021 Organizational and Foundational Standard for Medicolegal Death Investigation

PROMINENT COMMITTEE SERVICE

(contact J. Morrow for a complete list of reports generated by these Committees with authorship denoted)

Montana Climate Solutions Council, to provide Made-in-Montana Recommendations to Reduce Emissions and Prepare the State for Climate Impacts, appointed by Governor Bullock July 2019.

Executive Director, **National Science and Technology Council**, June 2013 – June 2015. See for comprehensive list of published reports <https://obamawhitehouse.archives.gov/administration/eop/ostp/nstc/docsreports>

US Government Global Water Strategy, International Water Working Group, Published November 2017.

Organization of Scientific Area Committees for Forensic Science, Subcommittee on Medicolegal Death Investigation, appointed October 2017.

Fast Track Action Committee on Response to Opioids, *Health Science and Technology Response to the Opioid Crisis*, National Science & Technology Council, organized on November 2017, report completed by April 2018.

Chair Cell Analysis Working Group, BIPM Bureau International des Poids et Mesures, CCQM Consultative Committee for Amount of Substances, Sevres, France, leadership formalized October 2016, group formed October 2015.

Chair Fast Track Action Committee on Strengthening the Medicolegal Death Investigation System, National Science & Technology Council, organized on September 2015.

Executive Secretary, **Task Force on Ebola-Response Science and Technology**, National Science & Technology Council, organized on October 2014.

Chair Fast Track Action Committee on Federal Science and Technology Workforce Capacity, National Science & Technology Council, organized on October 2014.

Lead, **STEM Workforce, Cross-Agency Priority Goal, Closing the Skills Gaps in STEM**, Office of Personnel Management, Chief Human Capital Officers, organized in September 2013.

US Global Change Research Task Force, US Global Change Research Program, organized September 2013 to provide strategic operational and scope program activities to support climate change adaptation and response.

Chair Microbiology Working Group, BIPM Bureau International des Poids et Mesures, CCQM Consultative Committee for Amount of Substances, Sevres, France, formalized April 2014.

Chair Steering Group on Microbiological Measurements to Ensure Food Quality and Safety, BIPM Bureau International des Poids et Mesures, CCQM Consultative Committee for Amount of Substances, Sevres, France, May 2012.

Chair Microbial Identity Working Group, **Steering Group on Microbiological Measurements to Ensure Food Quality and Safety**, BIPM Bureau International des Poids et Mesures, CCQM Consultative Committee for Amount of Substances, Sevres, France, organized October 2011.

Executive Secretary of the Subcommittee on Biological Defense Research and Development (BDRD), Committee on Homeland and National Security, National Science & Technology Council, organized on September 13, 2011.

Co-Chair **Interagency Biological Response and Recovery Science and Technology Working Group**, Subcommittee on BDRD, NSTC, organized November 21, 2011.

Interagency Microbial Forensics Advisory Board (IMFAB), Subcommittee on BDRD, NSTC, organized November 3, 2010.

Lead, **Microbial Forensics Education and Training on Microbial Forensics Science Working Group**, IMFAB, BDRD under the NSTC, organized January 6, 2011.

Federal Experts Security Advisory Panel, Tiering/reduction of Select Agent List Working Group, organized by Department of Health and Human Services and US Department of Agriculture, August 17, 2010.

Subcommittee on Standards for CBRN Detection, Roadmap Working Group, Committee on Homeland and National Security, National Science & Technology Council, organized on December 9, 2008, published *A National Strategy for CBRNE Standards May 2011*.

Interagency Biological Detection Standards Working Group, Subcommittee on Standards for CBRN Detection, Homeland Security Committee, NSTC, organized on January 2012.

Sloan Foundation Strategy Panel, Indoor Microbial Community Assessment Program, invitation from Paul Olsewski, Sloan Program Manager, Sloan Foundation, NY, NY, July 7, 2009.

Lead, Sampling Pillar of Interagency Working Group, Coordination of Federal Concepts of Operations for Biodetection, organized by Department of Homeland Security Science and Technology Directorate, February 2009, published *Framework for a Biothreat Field Response Mission Capability, April 2011*.

Standard Specific Task Group, revising a national sampling standard for collecting, packaging, and transporting visible powder samples suspected of being biological agents, December 2008.

Biocountermeasures Standards Working Group organized by Department of Homeland Security Science and Technology Directorate, participation started June 27, 2008.

Validated Sampling Plan Working Group organized by Department of Homeland Security Science and Technology Directorate, participation started January 1, 2008.

Federal Working Group for Biofilm Test Methods organized by Stephen Tomasino, US EPA - OPP Microbiology Laboratory, Environmental Science Center, Ft. Meade, MD, July 12, 2007.

INVITED LECTURES, EXPERT ADVISORY PANELS

1. Transforming biodefense to a Threat Agnostic Approach Experts Meeting, Center for Study of Weapons of Mass Destruction, National Defense University and Pacific Northwest National Laboratory, October 2021.
2. Subject Matter Expert, Tabletop Exercise on High-Consequence Biological Threats, Nuclear Threat Initiative, Washington, DC, December 11, 2019
3. Considerations in Assessing New Microbiological Measurement Technologies from a Standards Perspective, 5th

Recent Advances in Microbial Control, Microbiomes Matter, Clearwater Florida, November 6, 2018.

4. Opportunities to Collaborate to Support Our Communities in Response to Opioid Epidemic, Symposium on Synthetic Opioids and the Overdose Epidemic: Tackling Analytical Issues at the Bench and Beyond, Ann Arbor, MI, October 30-31, 2017.
5. Setting the Stage for Coordinated Research and Standards Development, Joint Workshop to Produce High-Quality and Consistent Evidence to Combat the Novel Psychoactive Substances Epidemic, Office of Justice Programs, Washington, DC, August 30, 2017.
6. Fostering a Culture of Inclusive Innovation, 2nd Annual Cultural Competency Summit, American Psychological Association, Arlington, VA, September 26, 2017.
7. Enabling Technology Through Standards and Policy, Healthcare for Aging and Elderly Summit, Bozeman, MT, July 18-21, 2017.
8. Implementation of the National Strategy: Establishing a Framework for Biothreat Field Response Mission Capability, National Fire Protection Association, Committee 472, Nashville, TN, September 27, 2016.
9. Resilient Systems: Opportunities for Science to Inform Policy and Strengthen Communities, Montana State University, Institute of Ecosystems, RoughCut Seminar Series, Bozeman, MT, March 26, 2016.
10. National Science and Technology Council – Overview and Opportunities for Engagement, Presidents Council of Advisors in Science and Technology (PCAST), National Academy of Sciences (NAS) 2101 Constitution Avenue, NW, Washington, DC, May 2014.
11. Fostering Diversity in the Federal S&T Workforce, National Academy of Engineering, Convocation of Engineering Professional Societies, Washington, DC, April 20-21, 2014.
12. The Federal government interagency, coordination and opportunities for emerging programs in the Obama Administration, University of Delaware, May 7, 2014.
13. Measurement Assurance for Biothreat Detection, Committee convened through the National Academies on PCR standards for the BioWatch program, Washington, DC, June 12, 2014.
14. National Science and Technology Council – Overview and Opportunities for Engagement, National Nanotechnology Stakeholders Meeting, Washington, DC, June 11, 2013.
15. Developing Standards to Support Conformity Assessment for Infectious Disease Diagnostics, Performance Standards Working Group, Diagnostics Interagency Working Group, Washington, DC, August 12, 2012.
16. Challenges in Microbial Sampling in the Indoor Environment, DHS Office of Health Affairs, Washington, DC, July 17, 2012.
17. Establishing a Framework for a Biothreat Field Response Mission Capability, NSTC, Subcommittee on Standards CBRNE meeting, Washington, DC, March 14, 2012.
18. Standards: An Integral Component in the Creation of a National Security Framework, Subcommittee on Standards for CBRN Detection, Homeland Security Committee, NSTC, Washington, DC, November 22, 2011.
19. A National Strategy for CBRNE Standards: Establishing a Framework for a Biothreat Field Response Mission Capability, French Ministry of Defense, France, September 26, 2011.
20. Operational Guidance and Standard Method for Bulk and Swab Sample Collection of Visible Powders Suspected of Being Biothreat Agents, Department Homeland Security, Biocountermeasures Standards Working Group, Washington, DC, September 16, 2011.
21. Validation and Uncertainty Assessment for Microbial Sampling, Validated Sampling Plan Working Group, Department of Homeland Security, July 26, 2011.
22. Operational Guidance and Standard Method for Bulk and Swab Sample Collection of Visible Powders Suspected

- of Being Biothreat Agents, Annual Meeting French Laboratory Response Network, BIOTOX PIRATOX, Paris, France, April 27-29, 2011.
23. Operational Guidance and Standard Method for Bulk and Swab Sample Collection of Visible Powders Suspected of Being Biothreat Agents, AOAC SPADA Meeting, Rockville, MD, March 31, 2011.
 24. Finding Microbes in Complex Indoor Environments, Howard Hughes Medical Institute Visiting Scholar Program, St. Joseph University, Department of Biology, Philadelphia, PA, March 23, 2011.
 25. Interagency Biological Restoration Demonstration (IBRD) Capstone Exhibition, *Panelist* Biological Incident Clearance Sampling, Seattle, WA, September 21-23, 2010.
 26. Interagency Biological Restoration Demonstration (IBRD) Capstone Exhibition, *Panelist* Biological Incident Sampling Techniques and Analysis, Seattle, WA, September 21-23, 2010.
 27. Building a Capability for Biothreat Detection: Lessons Learned and Useful Standards for Water Sustainability, Water Sustainability and Measurement Issues in Emerging Contaminants, Falls Church, VA, September 9-10, 2010.
 28. Biological Threat Detection and Sampling Standards Portfolio, Federal Bureau of Investigation, FBI Academy, Quantico, VA, August 13, 2010.
 29. Microbial Colonization of nonporous surfaces in a Workplace and residential environment, Center for Biofilm Engineering, Montana Biofilm Science and Technology Meeting, Bozeman, MT, July 13, 2010.
 30. Revision of ASTM E2458 Standard Method for Bulk and Swab Sample Collection of Visible Powders Suspected of Being Biothreat Agents: Update on Ballot, ASTM E54 Committee Meeting, St. Louis, MO, June 8, 2010.
 31. Revision of ASTM E2458 Standard Method for Bulk and Swab Sample Collection of Visible Powders Suspected of Being Biothreat Agents: Call for Vote, AOAC SPADA Meeting, Rockville, MD, June 3, 2010.
 32. Training of ASTM E2458 Standard Method for Bulk and Swab Sample Collection of Visible Powders Suspected of Being Biothreat Agents, International Hazardous Materials Response Teams Conference, Baltimore, MD, May 22, 2010.
 33. Revision of ASTM E2458 Standard Method for Bulk and Swab Sample Collection of Visible Powders Suspected of Being Biothreat Agents, International Association of Fire Chiefs, Main Committee Meeting, Baltimore, MD, May 19, 2010.
 34. Revision of ASTM E2458: Standard Method for Bulk and Swab Sample Collection of Visible Powders Suspected of Being Biothreat Agents, AOAC SPADA Meeting, Rockville, MD, March 4, 2010.
 35. Bacterial Pathogen Association with Water System Biofilms and Surfaces, USDA ARS, Beltsville, MD, February 17, 2010.
 36. Revision of ASTM E2458: Standard Method for Bulk and Swab Sample Collection of Visible Powders Suspected of Being Biothreat Agents, ASTM Meeting San Antonio TX, January 25, 2010.
 37. Development of Standard Sampling Methods for Biothreats on Nonporous Surfaces, DHS Office of Standards Program Review, Gaithersburg, MD, August 2009.
 38. Revision of ASTM E2458 for Sampling of Biothreats on Nonporous Surfaces, DHS Office of Standards Program Review, Gaithersburg, MD, August 2009
 39. Revision of ASTM E2458 for Sampling of Biothreats on Nonporous Surfaces, AOAC SPADA, 2009, Rockville, MD, August 2009.
 40. Biological Countermeasures Standards Portfolio, Armed Forces Institute of Pathology, Walter Reed Army Medical Center, Washington DC, June 2009.
 41. Revision of ASTM E2458 for Sampling of Biothreats on Nonporous Surfaces, International Hazardous Materials

- Response Team Conference. Sponsor: International Association of Fire Chiefs (IAFC), invited oral presentation, Hunt Valley, MD, June 1-6, 2009.
42. Revision of ASTM E2458 for Sampling of Biothreats on Nonporous Surfaces, Association of Public Health Laboratories, 2009 Annual Meeting and Third State Environmental Laboratory Conference invited oral presentation, Anchorage, AK, May 4-6, 2009.
 43. Surface Sampling of *Bacillus* Spores, 2008 Direct-Reading Exposure Assessment Methods (D.R.E.A.M.) Workshop, Alexandria, VA, November 2008.
 44. Standard Methods Development for Biodefense and Building Decontamination invited oral presentation, EPA 18th Annual Quality Assurance Conference, Dallas, TX, October 22, 2008.
 45. Biological Countermeasures Standards Portfolio invited oral presentation, MITRE Corp., McLean, VA, August 6, 2008.
 46. Biological Countermeasures Standards Portfolio invited oral presentation, Tauri Group, Alexandria, VA, June 2, 2008.
 47. Nanoparticle and Bacterial Pathogen Association with Water System Biofilms invited oral presentation, American Nuclear Society International Meeting, Washington DC, November 15, 2007.
 48. Decontamination of *Bacillus anthracis* Spores Associated with Simulated Drinking Water Biofilms, April 3, Environmental Microbiology Safety Lab, U. S. Department of Agriculture, Beltsville, Maryland.
 49. Decontamination of *Bacillus anthracis* Spores Associated with Simulated Drinking Water Biofilms, Earth Microbiology Initiative Seminar, Department of Earth and Environmental Engineering, Columbia University, New York, New York, March 30, 2007.
 50. Fate and Decontamination of *Bacillus thuringiensis* Spores and *Escherichia coli* O157:H7 Associated with Simulated Drinking Water Biofilms, OPP Microbiology Laboratory, U. S. Environmental Protection Agency, Ft. Meade, Maryland, August 29, 2006.
 51. *Bacillus* Spore Suspension Stability: Issues and Implications, Naval Medical Research Center Seminar, Biological Defense Research Directorate, Rockville, Maryland, June 9, 2006.
 52. Initial Attachment: the Role of Microscopic Interactions in the Fate and Transport of Pathogenic Bacteria in Water Systems, Civil and Environmental Engineering Seminar Series, University of Maryland - College Park, College Park, Maryland, April 12, 2006.
 53. Relating Atomic Force Microscopy Measurements to Macro-scale Observations of Bacterial Surface Association, Bugs and Biomaterials: Bacteria and the Biointerface UWEB Summer Symposium, Seattle, Washington, August 24-26, 2005.
 54. Atomic Scale Surface Roughness and Bacterial Adhesion, Surface Chemistry and Nanoscopic Evaluation of Bacterial Adhesion Seminar, Worcester Polytechnic Institute, Worcester, MA, April 2003.
 55. Microbial Transport and Organic Molecular Partitioning, Fate and transport of microbial and organic contaminants fate and transport in subsurface, Guest lecture at Smith College, 2003.
 56. Relativity of Roughness: Obtaining Useful Data with the AFM, Environmental Scholars Colloquium, University of Connecticut, Storrs, CT, November 2002.
 57. Biofilm Systems Training Laboratory: an Undergraduate Perspective, National Science Foundation Engineering Research Centers, Annual Meeting, Washington D.C. 1997.

CONFERENCE PRESENTATIONS AND PROCEEDINGS

(Presenting author underlined if not J. Morrow)

1. N.J. Lin, S.M. Da Silva, J.J. Filliben, J.B. Morrow. “Standards and Metrics to Support Field Biodetection.” TECMIPT - BioCAPAT Quarterly Meeting, Falls Church, VA, October 5, 2016.
2. J.B. Morrow, Fostering a Culture of Inclusive Innovation, Exchange with DOE Executives, DOE Headquarters, Washington DC, January 2017.
3. Morrow, J. B., Report to CCQM plenary: Report of the Cell Analysis Working Group and Strategic Plan, Serves, France, April 2017.
4. J. B. Morrow, Opportunities for enhanced communication and data sharing to support the opioid epidemic, leadership of OSAC Subcommittee on MDI, Toxicology and Seized Drug, Leesburg, VA, April 21, 2017.
5. N.D. Olson, J.M. Zook, J.B. Morrow, N.J. Lin “Challenging a Bioinformatic Tool’s Ability to Detect Microbial Contaminants Using in silico Whole Genome Sequencing Data.” NIST-DHS-FDA Standards for Pathogen Detection for Biosurveillance and Clinical Applications Workshop, Gaithersburg, MD, August 14-15, 2017.
6. J.B. Morrow, Organizer, Panel on Opportunities for leadership in STEM, La Tasca, Washington, DC, August 2017.
7. J.B. Morrow, Organizer, Panel on Opportunities for leadership in STEM, American Chemical Society, Washington, DC, August 2017.
8. J.B. Morrow, Strengthening response to the opioid epidemic with analytical capacity and data, Welcoming remarks: OJP, Washington, DC, Workshop Co-organizer and facilitator, August 30, 2017.
9. N.J. Lin, S.M. Da Silva, N.D. Olson, L.K. Vang, J.B. Morrow, Development of a yeast reference material surrogate to support biothreat detection, CCQM, CAWG, Ottawa, CN, September 2017.
10. Morrow, J. B., Report to CAWG: Report of the Cell Analysis Working Group and Strategic Plan, Ottawa, CN, September 28, 2017.
11. J.B. Morrow, Organizer, Panel on Opportunities in Diverse Career Trajectories for Women in STEM, NIST, Gaithersburg, MD. September 15, 2016.
12. Morrow, J. B., Report on the Microbiology Steering Group, CCQM Plenary, April 2016.
13. Olson, N., S. DaSilva, N. Lin, J. B. Morrow, Report to Nucleic Acid Working Group on genomic sequencing of microbes, CCQM, Serves, France, April 2016.
14. Olson, N., S. DaSilva, N. Lin, J. B. Morrow, Report to Cell Analysis Working Group on MBSG and Microbial Cell Counting Proposals, CCQM, Serves, France, April 2016.
15. N.J. Lin, S.M. Da Silva, N.D. Olson, L.K. Vang, J.B. Morrow, Standards Development Activities to Support Biothreat Detection, Association for Public Health Laboratories, Public Health Preparedness and Response, Silver Spring, MD, September 2016.
16. Morrow, J. B., Report to CCQM plenary: MBSG Completion of Chartered Responsibilities, Serves, France, April 2016.
17. N. J. Lin, J. B. Morrow, Renewal of ASTM Operational Response and Sample Collection Standards, AOAC International, Stakeholder Panel for Agent Detection Assays (SPADA) Meeting, Rockville, MD, March 2016.
18. J.B. Morrow, Implementation of the National Strategy: Establishing a Framework for Biothreat Field Response Mission Capability and other Resilience Efforts at NIST, Customs and Border Protection, Havre, MT, July, 2016.
19. M. Warner, J.B. Morrow, P. Braun, Workshop on Modernizing Mortality Data Systems and Analytic Tools at CDC, Public Health Informatics Conference, Atlanta, GA, August 21-24, 2016.
20. J. B. Morrow, Overview of MDI Systems: Opportunities for enhanced communication and data sharing, OSAC Subcommittee on MDI, Phoenix, Arizona, August 2016.

21. J. B. Morrow, Opportunities for enhanced communication and data sharing, OSAC Subcommittee on MDI, Leesburg, VA, January 2016.
22. J. B. Morrow, Opportunities for enhanced communication and data sharing, OSAC Subcommittee on Toxicology, Leesburg, VA, January 2016.
23. J.B. Morrow, Fostering a Culture of Inclusive Innovation, Exchange with NASA Executives, NASA Headquarters, Washington DC, September 12, 2016.
24. J.B. Morrow, Opening remarks: Background on MDI System and Enhancing Toxicology for MDI, NIST, Gaithersburg, MD, Workshop Co-organizer and host, September 14, 2016.
25. R. Cavanagh, Remarks to the National Commission on Forensic Science, Department of Justice, March 21, 2016, [Provided Remarks for NIST Director to deliver on SMDIS FTAC recommendations on enhancing the MDI system].
26. W. May, Remarks to the OSAC on NIST Forensic Science Program, Leesburg, VA, January 27, 2016, [Provided Remarks for NIST Director to deliver on SMDIS FTAC recommendations on enhancing the MDI system].
27. Da Silva, S. M., J. Filibin, L.K. Vang, N.D. Olson, J.B. Morrow, N.J. Lin. “Characterizing Saccharomyces Reference Material for qPCR Biosurveillance Monitoring,” ASM Biodefense, Washington DC, February 2015.
28. Da Silva, S. M., N. Olson, L. Vang, J. Morrow, N.J. Lin, “Surrogate Materials to Increase Confidence in Biosampling and Biothreat Detection,” Chemical and Biological Defense Science and Technology, St. Louis, May 12-14, 2015.
29. Olson, Nathan, J. Zook, J. B. Morrow, N. J. Lin, Computational Methods for Validating Microbial Genomic Reference Materials, ASM, New Orleans, April 2015.
30. Olson, N., S. DaSilva, N. Lin, J. B. Morrow, Report to Microbiology Steering Group, CCQM, Cerves, France, April 2015.
31. Da Silva, S. M., N. Olson, L. Vang, J. Morrow, N.J. Lin, “Surrogate Materials to Increase Confidence in Biosampling and Biothreat Detection,” Report to Microbiology Steering Group, CCQM, Cerves, France, April, 2015.
32. Morrow, J. B., Report to CCQM plenary, Cerves, France, April 2015.
33. N.J. Lin, S. Da Silva, N. Olson, L. Vang, J. Morrow, “Surrogate Materials to Increase Confidence in Biosampling and Biothreat Detection,” International Forum on Process Analytical Chemistry (IFPAC) OnSite Annual Meeting, Arlington, VA, January 2014.
34. Olson, N., S. DaSilva, N. Lin, J. B. Morrow, Report to Microbiology Steering Group and Bioanalysis Working Group, CCQM, Cerves, France, April 2014.
35. Morrow, J. B., Report to CCQM plenary, Cerves, France, April 2014.
36. S.M. Da Silva, L.K. Vang, N.D. Olson, J.B. Morrow, N.J. Lin. “Development of a Reference Material for qPCR Biosurveillance Monitoring,” IFPAC OnSite 2014 Annual Meeting, Arlington, VA, January 2014.
37. S.M. Da Silva, L.K. Vang, N.D. Olson, A.S. Downey, Z. Kelman, M.L. Salit, J.B. Morrow, N.J. Lin. “Modified Yeast as a Prototype Reference Material for Nucleic Acid-Based Detection Technologies,” American Society of Microbiology, Boston MA, May 2014.
38. J.B. Morrow, Challenges in microbial sampling in the indoor environment, BioFutures Conference, Washington, DC, September 1, 2012.
39. J.B. Morrow, J. Attencia, “Microbial Chemotaxis: mechanisms for cell/matrix separation”, USDA Agriculture Research Service, Beltsville, MD, July 24, 2012.

40. S.M. Da Silva, A.S. Downey, N.D. Olson, J.B. Morrow, "Parameters Affecting Bacterial Collection and their Impact on Downstream Analysis", The Knowledge Foundation's 19th International conference – Integrating Sample Preparation. Washington, DC, December 8-9th, 2011.
41. N.D. Olson, S.M. Da Silva, A.S. Downey, J.B. Morrow, "Evaluation of DNA extraction efficiency for a suite of organisms using 5 different extraction methods", Sample Preparation, Washington, DC, December 8-9, 2011.
42. J.B. Morrow, "The Role of Measurement Reliability and Comparability in Providing Confidence in Our Global Food Supply," 5th National Biothreat Meeting, Denver, CO, March 2012.
43. L. Vang, D. Ross, Z. Kelman, M. Salit, J.B. Morrow, "Development of Framework for Assessing Technical Performance of Detection Systems for Biothreat Targets Using Surrogate Control Materials," 5th National Biothreat Meeting, March 2012, Denver, CO.
44. Downey, J. B. Morrow, "Investigation of Systematic Sequencing Errors Introduced During Microbial Genome Sequencing," 5th National Biothreat Meeting, March 2012, Denver, CO.
45. N. Olson, J. B. Morrow, "Evaluation of Extracted DNA Quality and Quantity," 5th National Biothreat Meeting, March 2012, Denver, CO.
46. Da Silva, S. M., N. Olson, A.S. Downey, J. B. Morrow "Parameters Affecting Recovery of Bacterial Spores and Vegetative Cells from Surfaces," 5th National Biothreat Meeting, March 2012, Denver, CO.
47. N. Olson, J. B. Morrow, "Evaluation of Extracted DNA Quality and Quantity," Onsite Annual Meeting for Homeland Security, Forensics, and Environmental Remediation, January 2012, Baltimore, MD.
48. L. Vang, Z. Kelman, D. Ross, M. Salit, J. B. Morrow, "Developing a Surrogate Control Material for Assessing Technical Performance of Field Detection Systems," Onsite Annual Meeting for Homeland Security, Forensics, and Environmental Remediation, January 2012, Baltimore, MD.
49. Da Silva, S. M., A.S. Downey, J. B. Morrow, "Parameters Affecting Recovery of Bacterial Spores and Vegetative Cells from Surfaces," Onsite Annual Meeting for Homeland Security, Forensics, and Environmental Remediation, January 2012, Baltimore, MD.
50. Da Silva, S. M., A.S. Downey, J. B. Morrow, "Parameters Affecting Recovery of Bacterial Spores and Vegetative Cells from Surfaces," EPA Decontamination Research and Development Conference, November 2, 2011.
51. Hawkins, B.G., J. B. Morrow, and S. P. Forry, "Development and Characterization of Standardized *Pseudomonas* Biofilms in Microfluidic Devices," Gordon Research Conference on Microbial Adhesion and Signaling, July 2011.
52. Hawkins, B.G., J. B. Morrow, and S. P. Forry, "Development and Characterization of Standardized *Pseudomonas* Biofilms in Microfluidic Devices," Gordon Research Conference on the Physics and Chemistry of Microfluidics, June 2011.
53. L. Vang, Z. Kelman, D. Ross, M. Salit, J. B. Morrow, "Developing a Surrogate Control Material for Assessing Technical Performance of Field Detection Systems" OnSite, Baltimore, MD, January 19, 2011.
54. J. B. Morrow, "Sample collection and operational guidance for initial response to suspected biothreats", 4th National Bio-threat Conference, Sampling: from Enabling Confirmation to Clearance, New Orleans, LA, December 7-9, 2010.
55. L. Vang, Z. Kelman, D. Ross, M. Salit, J. B. Morrow, "Developing a Surrogate Control Material for Assessing Technical Performance of Field Detection Systems", 4th National Bio-threat Conference, New Orleans, LA, December 7-9th, 2010.
56. L. Vang, Z. Kelman, D. Ross, M. Salit, J. B. Morrow, "Developing a Surrogate Control Material for Assessing Technical Performance of Field Detection Systems", OnSite, Baltimore, MD, January 17 – 21st, 2011.

57. Da Silva, S. M., A.S. Downey, J. B. Morrow, "Parameters Affecting Recovery of Spores and Vegetative Cells During Surface Sampling", OnSite, Baltimore, MD, January 17 – 21st, 2011.
58. Da Silva, S. M., A.S. Downey, J. B. Morrow, "Parameters Affecting Recovery of Spores and Vegetative Cells During Surface Sampling", 4th National Bio-threat Conference, New Orleans, LA, December 7-9th, 2010.
59. A.S. Downey, J. B. Morrow, "Microbial Surface Colonization in a Workplace and Residential Indoor Environment" 4th National Bio-threat Conference, New Orleans, LA, December 7-9th, 2010.
60. Da Silva, S. M., A.S. Downey, J. B. Morrow, "Standard Methods Development for Sampling Spores and Other Biological Contaminants", Symposium on Surface and Dermal Sampling, ASTM Committee D22 on Air Quality, San Antonio, TX, October 14, 2010.
61. Da Silva, S. M., A.S. Downey, J. B. Morrow, "Standard Methods Development for Sampling Spores and Other Biological Contaminants", Symposium on Surface and Dermal Sampling, ASTM Committee D22 on Air Quality, San Antonio, TX, October 14, 2010.
62. J. B. Morrow, A.S. Downey, Da Silva, S. M., "Microbial Colonization of nonporous surfaces in a Workplace and residential environment", Symposium on Surface and Dermal Sampling, ASTM Committee D22 on Air Quality, San Antonio, TX, October 14, 2010.
63. J. B. Morrow, "Equitable Collaborations", CBRNIAC Forum on Bioforensics Resources and Repositories, Battelle Eastern Science & Technology Center in Aberdeen, MD, March 31, 2010.
64. J. B. Morrow, "Revision of ASTM E2458: Standard Method for Bulk and Swab Sample Collection of Visible Powders Suspected of Being Biothreat Agents", ASM Biodefense 2010, Baltimore, MD, February 21-24, 2010.
65. A.S. Downey, Da Silva, S. M., J. B. Morrow, "Parameters affecting variability in surface sampling performance". ASM Biodefense 2010, Baltimore, MD, February 21-24, 2010.
66. Da Silva, S. M., A.S. Downey, J. B. Morrow, "Impact of Extraction Efficiency on Wipe Surface Sampling of *B. anthracis* Sterne". ASM Biodefense 2010, Baltimore, MD, February 21-24, 2010.
67. Da Silva, S. M., A.S. Downey, J. B. Morrow, "Parameters affecting variability in surface sampling performance". On-Site 2010, 8th International Conference on On-Site Analysis for Homeland Security, Forensics and Environmental Remediation, Baltimore, MD, February 1-4, 2010, (with Downey, A.S. Da Silva, S. M.).
68. Da Silva, S. M., A.S. Downey, J. B. Morrow, "Impact of Extraction Efficiency on Wipe Surface Sampling of *B. anthracis* Sterne". On-Site 2010, 8th International Conference on On-Site Analysis for Homeland Security, Forensics and Environmental Remediation, Baltimore, MD, February 1-4, 2010.
69. J. B. Morrow, S. M. DaSilva, "Standard Method for Dynamic Wipe Efficiency Determination", ASM Biodefense, Baltimore, 22-25th February 2009.
70. J. B. Morrow, S. M. DaSilva, "Surface Sampling for *B.anthraxis* spores on nonporous surface – extraction efficiency" NIST Sigma Xi, Gathiersburg, MD, February 11th, 2009.
71. J. Attencia, J. B. Morrow and L. Locascio, "Microfluidic Device to Investigate Microbial Response to Chemical Gradients", 7th Annual ASM Biodefense and Emerging Diseases Research Meeting, February 22- 25, 2009 in Baltimore, MD.
72. J. Attencia, J. B. Morrow and L. Locascio, "Microfluidic Device to Investigate Microbial Response to Chemical Gradients" 13th ICSCS/83rd CSS Symposium, pp 160, June 14-19, 2009, New York, USA.
73. J. B. Morrow, "Development of a Standard Method for Dynamic Wipe Efficiency Estimation" 3rd National Conference on Environmental Sampling and Detection for Bio-threat Agents, Las Vegas, Nevada, December 2-4, 2008.

74. J. Attencia, J. B. Morrow and L. Locascio, “The Microfluidic Palette: Generation of diffusive concentration gradients” 12th International Conference on Miniaturized Systems for Chemistry and Life Sciences, San Diego, CA, October 12-16, 2008.
75. J. B. Morrow, B. Jones, K. D. Cole, “Impact of Surface Properties on Suspension Stability and the Surface Association of *Bacillus* Spores” 235th American Chemical Society National Meeting and Exposition, New Orleans, LA, April 6-10, 2008.
76. J.B. Morrow, J. Almeida, L. Fitzgerald and K. D. Cole, “Triggered Germination for Efficient Decontamination of *Bacillus anthracis* Sterne Spores Associated with Simulated Treated Water Systems” poster presentation, 2008 ASM Biodefense and Emerging Diseases Research Meeting, Marriott Waterfront Hotel, Baltimore, MD, February 24-27, 2008.
77. R. D. Holbrook, V. Reipa, K. D. Cole, J. B. Morrow, “Nanoparticle and Bacterial Pathogen Association with Water System Biofilms” invited oral presentation, American Nuclear Society International Meeting, Washington DC, November 15, 2007.
78. R. D. Holbrook, J. Choi, V. Reipa, T. E. Murphy, A. M. Rossi, J. B. Morrow, “Cytotoxicity of Silicon Nanocrystals in *Bacillus cereus*” poster presentation, Society of Environmental Toxicity and Chemistry (SETAC) Europe 17th Annual Meeting, Porto, Portugal, May 20-24, 2007.
79. R. D. Holbrook, K. E. Murphy, M. R. Beversluis, K. D. Cole, J. B. Morrow, “Trophic Transfer of Surface Functionalized Quantum Dots in a Simplified Food Web” oral presentation by R. D. Holbrook, Society of Environmental Toxicity and Chemistry (SETAC) Europe 17th Annual Meeting, Porto, Portugal, May 20-24, 2007.
80. J. B. Morrow, R. D. Holbrook, K. E. Murphy, M. R. Beversluis, K. D. Cole, “Accumulation of Nanomaterials by Biological Organisms – Methods for Differentiating Uptake from Artifact” poster presentation, Society of Environmental Toxicity and Chemistry (SETAC) Europe 17th Annual Meeting, Porto, Portugal, May 20-24, 2007.
81. J. B. Morrow, R. D. Holbrook, J. Choi, T. E. Murphy, A. M. Rossi, V. Reipa “Cytotoxicity of Silicon Nanocrystals in *Bacillus cereus*” poster presentation, 2nd Nanotoxicity Conference, San Servolo, Venice, Italy, April 19-21, 2007.
82. J. B. Morrow, B. F. Smets, and D. Grasso, “Proteinaceous Surface Appendage Contributions to *Pseudomonas aeruginosa* PAO1 Surface Properties and Adhesion Ability” poster presentation, European Geosciences Union General Assembly, Vienna, Austria, April 15-20, 2007.
83. J.B. Morrow, J. Almeida, L. Fitzgerald and K. D. Cole, “Decontamination of *Bacillus anthracis* Spores Associated with Water System Biofilms” poster presentation, 2007 ASM Biodefense Research Meeting, Hyatt Regency Washington Hotel, Washington, DC, February 27-March 2, 2007.
84. J. B. Morrow, K. D. Cole and V. Reipa, “Raman Spectroscopy Analysis of *Bacillus* Spore Germination and Outgrowth” poster presentation, 2007 ASM Biodefense Research Meeting, Hyatt Regency Washington Hotel, Washington, DC, February 27-March 2, 2007.
85. R. D. Holbrook, Y. Xiao, P.E. Barker, J. B. Morrow, and T.K. Mangel, “Fate of Nanoparticles in Biological Systems – Lessons About Quantum Dot Behavior in Bacterial and Mammalian Cells” poster presentation, Microscopy and Microanalysis 2006 Meeting, Chicago, IL, July 30- August 3, 2006.
86. J. B. Morrow, R. D. Holbrook, C. J. Zeissler, “Quantum Dot Dissemination and Behavior in Bacterial Biofilms” conference proceedings, 2006 Nano Science and Technology Institute Nanotechnology Conference, Boston, MA, May 7-11, 2006.
87. J. B. Morrow, J. Almeida and K. D. Cole, “Measurement of the Surface Properties of *Bacillus* Spores: Implications for Producing Reference Materials” poster presentation, 2006 BERM 10, 10th International Symposium on Biological and Environmental Reference Materials, Doubletree Hotel, Charleston, SC, April 30 to May 4, 2006.

88. J. B. Morrow, J. Almeida and K. D. Cole, "Surface Properties and Biological Association Propensity of *Bacillus* Spores" poster presentation, 2006 ASM Biodefense Research Meeting, Hyatt Regency Washington Hotel, Washington, DC, February 15-18, 2006.
89. J. B. Morrow, J. Almeida and K. D. Cole, "Decontamination of *Bacillus thuringiensis* Spores Associated with Drinking Water Biofilms" poster presentation, 2006 ASM Biodefense Research Meeting, Hyatt Regency Washington Hotel, Washington, DC, February 15-18, 2006.
90. J. B. Morrow, R. Stratton, B. F. Smets, and D. Grasso, "Role of Cellular Appendages in Adhesion and Transport of *Pseudomonas aeruginosa* PAO1 in Porous Media" poster presentation, 78th American Chemical Society Colloid and Surface Science Symposium, Yale University, New Haven, CT, June 20-23, 2004.
91. J. B. Morrow, H. H. Yang, B. F. Smets, and D. Grasso, "Mineral-based Biobarriers to Attenuate *Escherichia coli* Transport: Effect of Mineral and Cell Surface Chemistry" poster presentation 104th American Society of Microbiology General Meeting, New Orleans, LA, May 23-27, 2004.
92. J. B. Morrow, B. F. Smets, and D. Grasso, "Role of Cellular Appendages in Initial Attachment and Adhesion of *Pseudomonas aeruginosa* PAO1" poster presentation American Society for Microbiology Conference on Biofilms, Victoria, British Columbia, Canada, November 1-7, 2003.
93. J. B. Morrow, B. F. Smets, and D. Grasso, "Conjugal Plasmids Impact the Surface Chemistry and Static Biofilm Formation of *Pseudomonas putida* KT2440" poster presentation Pseudomonas 2003 International Meeting, Quebec City, Quebec, Canada, September 6-10, 2003.
94. J. B. Morrow, C. Ely, I. Nieves, K. Noll, B. F. Smets and T. Osborn, "Bridging Disciplines: An Interdisciplinary and Learner-Centered Approach to Teaching Evaluation" poster presentation AEESP Education and Research Conference, Toronto, Canada, August 10-14, 2002.
95. J. B. Morrow, C. Arango, B. Torres, B. F. Smets "Plasmid Transfer Evaluation In Soil Microbial Communities Under Environmental Stress" poster presentation and conference proceedings, 6th International In-situ and Onsite Bioremediation Symposium, San Diego, CA, June 4-7, 2001.
96. J. B. Morrow, B. F. Smets, "Evaluation of Heavy Metal Resistance Plasmid Transfer in Soil Microbial Communities Under Heavy Metal Stress", poster presentation, Gordon Research Conference on Applied and Environmental Microbiology, New London, CT, July 3-8, 2001.
97. J. B. Morrow, B. F. Smets, "Abundance of Heavy Metal Resistance Plasmids in Subsurface Microbial Communities of Varying Degrees of Cadmium Stress" presentation American Chemical Society 220th National Meeting, Washington, D.C., August 20-24, 2000.
98. J. B. Morrow, O. A. Zelennikova, M. Panciera, B. F. Smets, "Horizontal Gene Transfer In Subsurface Microbial Community Under Heavy Metal Stress", poster presentation, 4th International Symposium on Subsurface Microbiology, Vail, CO, August 22-27, 1999.

SYMPOSIA/CONFERENCES ORGANIZED

IBEC Lessons-Learned Summit Series, 2021, in partnership with AIHA, ABSANZ, IEQ-GA

Pain Points and Lessons Learned from COVID-19, 2021, with Jim Swan, Barb Stiffarm, Kali Wicks, Kenneth Martinez, assess of the current challenges and discuss innovative solutions to safely move forward, Montana Innovation Hub

Created CLEAN 2020 Summit to reduce indoor transmission of SARS-CoV-2, August 5, 2020 to current, virtual Summit.

Steering Committee, Symposium on Synthetic Opioids and the Overdose Epidemic: Tackling Analytical Issues at the Bench and Beyond, Ann Arbor, MI, October 30-31st, 2017.

Steering Committee and Co-organizer, Coordinated Research and Standards Development to Produce High-Quality and Consistent Evidence to Combat the Novel Psychoactive Substances Epidemic, Office of Justice Programs, Washington, DC, August 30, 2017.

Co-organizer, Forensic Toxicology Testing for Medicolegal Death Investigation Workshop, National Institute of Standards and Technology, Gaithersburg, MD, September, 14, 2016

Co-organizer, Medicolegal Death Investigation System Data Infrastructure Requirements Workshop, National Science and Technology Council, Committee on Strengthening the Medicolegal Death Investigation System, Washington, DC, September 2015.

Co-organizer, Medicolegal Death Investigation System Data Quality Workshop, National Science and Technology Council, Committee on Strengthening the Medicolegal Death Investigation System, Washington, DC, October 2015.

Co-organizer, Workforce Data Jam, Eisenhower Executive Office Building, Washington, DC, January 23, 2014

Organizer, Super-charged Science, Technology, Engineering and Mathematics Re-entry Workshop: Creating Opportunities Eisenhower Executive Office Building, Washington, DC, October 10, 2014

Co-Organizer with CDC, Best Practices for Rapid and Emerging Diagnostic Techniques, American Society of Microbiology 112th General Meeting, June 18, 2012, San Francisco, CA.

Organizer, Measurements and Operational Guidance for Food Safety, 5th National Bio-threat Conference, March 26-29, 2012, Denver, CO.

Advisor NASA/ESA Life Detection Workshop, Methods and Protocols for Detection of Life in Samples from Mars, February 12-17, 2012.

Chair On-Site 2012, Onsite Annual Meeting for Homeland Security, Forensics, and Environmental Remediation, January 2012, Baltimore, MD.

Organizing Committee, Metrology and the need for reliable microbial measurement/testing results, BIPM Bureau International des Poids et Mesures, CCQM Consultative Committee for Amount of Substances Workshop, April 7-9, 2011, Sevres, France.

Organized the Sampling the Indoor Microbiome Workshop, NIST and Yale University in partnership with the Sloan Foundation Indoor Microbial Community Assessment Program, held February 14-15, 2011, NIST, Gaithersburg, MD.

Co-Chair On-Site 2011, Integration of Sample Collection and Detection for CBRNE Field Analytics, January 18-21st, 2011, Baltimore, MD.

Organizer, 4th National Bio-threat Conference, Parallel sessions Sampling: from Enabling Confirmation to Clearance, December 7-9, 2010, New Orleans, LA.

Collaboration to evaluate the fate and transport of pathogenic microorganisms in irrigation waters, USDA internally funded five-year program (with Y. Pachepsky (USDA ARS), D. Shelton (USDA ARS), A. Downey)

Organizing Committee On-Site 2010, Standards Development to Support CBRNE Field Analytics, February 2-4th, 2010, Baltimore, MD.

Symposium Co-Chair, Biological Aerosol Detection and Sampling American Association for Aerosol Research 29th Annual Conference, October 25-29th, 2010, Portland, OR.

Organizing Committee CBRNIAC Forum Bioforensics Resources and Repositories, Session on Equitable Collaborations, March 31, 2010, Aberdeen, MD.

Symposium Chair, Sampling and Biothreat Detection Integration, ACS National Meeting & Exposition August 16-20, 2009, Washington, DC.

Collaboration to Develop Advanced Neutron Radiography Imaging Technique, NIST program in February 2009 (with Dave Holbrook, Greg Downing)

Develop software guidance to address rapid triage of biological contamination in the built environment with BFRL (Andy Persily).

VOLUNTEER SERVICE

Elected Chair, Board of the Women's Foundation of Montana, January 2021.

Appointed to the International Advisory Board, Journal of Accreditation and Quality Assurance, January 2018

Appointed to the Women's Foundation of Montana Board, Helena, Montana, March 2018

Appointed to the Sweet Medical Board, Community Health Center, Chinook, Montana, October 2017

Volunteer coaching for Sally Ride ToyChallenge competition

Volunteer training and laboratory project development for microbiology for Middle School Teacher LAB at NIST

TECHNICAL LABORATORY PROGRAM ASSESSOR

Peer Review of the Departamento Salud Ambiental Y Nomras De Systema De Calidad A Aplicar Sequen Area (Department of Environmental Health) in the Institute of Public Health, Santiago, Chile, January, 2012 and December, 2016

REVIEWER/REFEREE

Journal of Accreditation and Quality Assurance

Applied and Environmental Microbiology

Environmental Science and Technology

Environmental Engineering Science

Colloids and Surfaces B: Biointerfaces

Journal of Membrane Science

Journal of Environmental Engineering, ASCE

Journal of Environmental Engineering and Science

Journal of accreditation and quality assurance

journal of analytical toxicology

PROFESSIONAL AFFILIATIONS

Association of Environmental Engineering and Science Professors, Chi Epsilon, Sigma Xi

Tau Beta Pi, American Society for Civil Engineers, American Society for Microbiology, American Chemical Society

AWARDS AND HONORS

- **2021 Graduate, Leadership Montana**
- **2019 Environmental Protection Agency, Bronze Medal Award**, National Science and Technology Council's Contaminants of Emerging Concern Research and Development Task Force, for the development and publication of a cross-agency research plan to address critical gaps for contaminants of emerging concern in drinking water within 6 months of assignment.
- **2018 Department of State, Superior Honor Award**, for exceptional collaboration and dedication in creating the first U.S. Global Water Strategy and contributing to a more prosperous, peaceful, and water-secure world, shared with members of the Interagency Water Working Group.
- **2014 Office of Science and Technology Policy Excellence in Service Award**, for enhancing the quality and agility of the National Science and Technology Council operations while timely supporting convening of critical subject matter experts during a National challenge, in the Month of October.
- **2011 Presidential Early Career Award Science and Engineering (PECASE)**, for pioneering research on the properties of microbial systems, in particular the characterization of bacteria-surface interactions and the fate and

transport of microbial pathogens in environmental matrices, and for commitment to preparing the next generation of young scientists through the NIST Summer Undergraduate Internship Program

- 2018 Department of Commerce, Ten Year Civil Service Award.
- Graduate of Building the Next Generation of Leaders, NIST Leadership and Employee Development Program
- First Place, Biology Division of the Sigma Xi Poster Competition, National Institute of Standards and Technology, 2007
- National Research Council, Department of Homeland Security Post-Doctoral Fellowship, 2006
- Department of Education, GAANN Environmental Biotechnology Ph.D. Fellowship Recipient, University of Connecticut 2001-04.
- Sigma Xi, Scientific Honor Society, 2004
- Tau Beta Pi Engineering Honor Society, 2004
- Chi Epsilon Civil Engineering Honor Society, 2004
- National Science Foundation Undergraduate Research Fellowship Recipient, Center for Biofilm Engineering, Montana State University 1995-98
- Society of Women Engineers National Presentation Competition Third Place Winner, 1996

PRESS AND OUTREACH PUBLICATIONS

When the virus is inside the building: How architects and HVAC systems could help combat COVID-19 — and the next airborne pathogen — in the built environment (March 3, 2021) <https://montanafreepress.org/2021/03/03/when-the-virus-is-inside-the-building/>

Fireside Chat: Critical MSU research supporting Montana, Montana State University Alumni Foundation, <https://www.msuaaf.org/s/1584/index.aspx?sid=1584&gid=1&pgid=4934>

MSU takes leadership role in summit on minimizing COVID-19 risk in human-built environments (August 24, 2020) <https://www.montana.edu/news/20339/msu-takes-leadership-role-in-summit-on-minimizing-covid-19-risk-in-human-built-environments>

MSU receives grant for new COVID-19 testing research (October 2020) <https://nbcmontana.com/news/local/msu-receives-grant-for-new-covid-19-testing-research>

Tuss, Morrow appointed to Montana council on climate change, Two local residents were among a lengthy list of people Gov. Steve Bullock appointed to the Montana Climate Solutions Council (July 2019) <https://www.havredailynews.com/story/2019/07/23/local/tuss-morrow-appointed-to-montana-council-on-climate-change/524712.html>

Laboratory News, Evidence Technology Magazine, Analytical Strategies for the Opioid Crisis (September 2018) http://www.evidencemagazine.com/index.php?option=com_content&task=view&id=2742

Daily Post, Los Alamos, Federal, State and Local Partnership Identifies Analytical Strategies for Responding to the Opioid Crisis (August 27, 2018) <https://www.ladailypost.com/content/federal-state-and-local-partnership-identifies-analytical-strategies-responding-opioid>

Department of Justice, Office of Justice Programs Communications Office Publication Advisory, Federal, State and local Partnership Identifies Analytical Strategies for Responding to the Opioid Crisis (August 27, 2018) <https://ojp.gov/newsroom/pressreleases/2018/ojp-news-08272018.pdf>

- The Detroit News, Lab Experts Cite Need for Collaborations on Opioids (October 30, 2017), <https://www.detroitnews.com/story/life/wellness/2017/10/30/lab-experts-cite-need-collaborations-opioids/107181976/>
- NIST Web communication, Forensic Toxicology Testing for Medicolegal Death Investigation Workshop, Gaithersburg, MD, September 2016 <https://www.nist.gov/mml/forensic-toxicology-testing-medicolegal-death-investigation-workshop>
- White House blog: Leading Innovation Through a World-Class Federal Science and Technology Workforce (July 27, 2016) <https://obamawhitehouse.archives.gov/blog/2016/07/27/leading-innovation-through-world-class-federal-science-and-technology-workforce>
- White House Office of the Press Secretary, Fact Sheet: Administration Announces Actions to Protect Communities from the Impacts of Climate Change (April 2015) <https://obamawhitehouse.archives.gov/the-press-office/2015/04/07/fact-sheet-administration-announces-actions-protect-communities-impacts->
- White House Office of Science and Technology Policy and Office of Personnel Management, Fact Sheet: Celebrating Careers and Contributions of Federal Scientists and Technology Workforce (October 2014) https://obamawhitehouse.archives.gov/sites/default/files/microsites/ostp/factsheet_stemworkforce_oct-8-2014.pdf
- Office of Personnel Management Director Blog Post, STEM Workforce, Data Jam (January 28, 2014) <https://www.opm.gov/blogs/Director/stem-workforce/>
- NIST Tech Beat: Report Details Efforts to Improve, Advance Indoor Microbial Sampling (May 29, 2012)
- Marusina, K., Sample-prep advances open up new possibilities. *Genetic Engineering and Biotechnology News*, 2012, 32(1)
- NIST Tech Beat: New Guidance Issued for First Responders Collecting Suspected Biothreat Agents (November 24, 2010)
- NIST Tech Beat: NIST Seeks Improved Recovery of Samples from Biohazard Events (April 13, 2011)
- NIST Tech Beat: Operation Vigilant Sample: First Responder Training for Suspicious Powders (August 2, 2011)