THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

OPENING MODERATING PANEL

Organization: White House Office of Science and Technology Policy

Background

- In September 2021, release of American Pandemic Preparedness: Transforming Our Capabilities Plan with Goal (8.2) Pathogen protection within the built environment
- Coordinates whole-of-government S&T innovation through the Steering Committee on Pandemic Innovation

Links to GUVI

- First Annual Report on Progress Toward Implementation of the American Pandemic Preparedness Plan lists progress and future goals for GUV and built environment interventions
- **"Let's Clear the Air on COVID" blog post** and **webinar** from head of OSTP Dr. Alondra Nelson on reducing indoor disease transmission risk

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

OPENING MODERATING PANEL

Organization: White House Office of Science and Technology Policy

GUVI's Most Pressing Issues Right Now

- Develop standard efficacy testing methods for air treatment technologies that promote appropriate labeling and informed use and enable high-quality, standardized, innovative products to come to market in a trusted manner.
- Conduct multidisciplinary epidemiological and implementation research on built environment technologies for reducing disease spread like GUV.
- Establish indoor air quality and built environment interventions like GUV as routine and significant parts of public health and epidemiological strategy

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

OPENING MODERATING PANEL

Organization: White House Office of Science and Technology Policy

GUVI's Most Important Goals for the Next 10 Years

- Expand and train workforce for installation and maintenance of GUV installations
- Develop more affordable form factors and fixtures for GUV including LED lights
- Support innovation in building and infrastructure design, indoor air quality monitors, pathogen sensors, advanced materials, and air disinfection technologies to foster healthy, safe and secure working, learning, and living environments for all

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

OPENING MODERATING PANEL

Organization: Pacific Northwest National Laboratory

Background

- U.S. Department of Energy National Laboratory

Links to GUVI

- Research, Development, and Deployment for GUV Air Disinfection
- Current work focused on:
  - Characterizing GUV effectiveness, energy efficiency, decarb opportunity in buildings
  - GUV field evaluations + demonstrations
  - Product testing, validation, and associated education

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

OPENING MODERATING PANEL

Organization: Pacific Northwest National Laboratory

GUVI's Most Pressing Issues Right Now

1. Field evaluations/demonstrations to show technology is safe and effective
2. Guidelines + educated workforce to design, install, operate, maintain GUV systems in buildings
3. Validate and/or document safety of far-UV direct irradiation before deployment

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

OPENING MODERATING PANEL

Organization: Pacific Northwest National Laboratory

GUVI's Most Important Goals for the Next 10 Years

1. Ensure safety of technology in occupiable spaces
2. Educated workforce to design, install, operate, and maintain
3. Clear guidelines/standards of most effective and efficient combinations of risk mitigation strategies (GUV, ventilation, room air cleaners, etc.) for IAQ and reduced disease transmission

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

OPENING MODERATING PANEL

Organization: Food and Drug Administration, Center for Devices and Radiological Health

Background

- Team lead for the Sterility Devices Team in the Office of Surgical and Infection Control Devices

Links to GUVI

- Regulates medical devices that use UV technology

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

OPENING MODERATING PANEL

Organization: Food and Drug Administration, Center for Devices and Radiological Health

GUVI's Most Pressing Issues Right Now

- Alignment on what are considered medical claims
- Addressing ongoing pandemic concerns

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

OPENING MODERATING PANEL

Organization: Food and Drug Administration, Center for Devices and Radiological Health

GUVI's Most Important Goals for the Next 10 Years

- Continue to collaborate with the agency to bring safe and effective products to the market

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

OPENING MODERATING PANEL

The opinions presented here are my own and do not necessarily represent the views of the National Institute for Occupational Safety and Health or Centers for Disease Control and Prevention. They should not be construed to represent any agency determination or policy.

Organization: CDC/NIOSH

Background

- Over 25 years of engineering controls and infection control
- PhD in Architectural Engineering (mechanical) with UV focus
- Led Filtration/Disinfection Team, ASHRAE Epidemic Task Force

Links to GUVI

- ASHRAE TC 2.9 founding member
- ASHRAE SSPC 185 Chair; ASHRAE GPC 37 Vice-chair

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

OPENING MODERATING PANEL

Organization: CDC/NIOSH

GUVI's Most Pressing Issues Right Now

- Continuing to understand the role UV technologies can play throughout local, state, and federal government agencies
- Decoupling UV air treatment from UV surface disinfection
- Improving guidance for design, installation, commissioning, operation and periodic performance validation
- Documenting successful in-duct UV air treatment case studies

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

OPENING MODERATING PANEL

Organization: CDC/NIOSH

GUVI's Most Important Goals for the Next 10 Years

- Increase knowledge about the benefits/limitations of far UV
- Enhance design, installation and operation guidance
  - Focus on end-users and decision makers
  - Cover all accepted/proven UV technologies
  - Establish proven, user-friendly performance verification protocols
  - Provide credentialing for system designers/installers
- Take steps toward standard testing and regulation

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

OPENING MODERATING PANEL

Organization: NIST Standards Coordination Office

Background

- Assist government agencies with standards and conformity assessment issues
- NTTAA and OMB Circular A-119

Links to GUVI

- Supporting NIST technical experts

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

OPENING MODERATING PANEL

Organization:

GUVI's Most Pressing Issues Right Now

- Consensus-based standards and test methods
- Consistent approaches to conformity assessment
- Stakeholder awareness

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

OPENING MODERATING PANEL

Organization:

GUVI's Most Important Goals for the Next 10 Years

- Sound, widely-accepted standards and test methods for determining efficacy and safety
- Coordination among public and private sector stakeholders
- Framework for how to leverage progress when addressing the next challenge

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

OPENING MODERATING PANEL

Organization:

Background

- Mechanical Engineer with OSHA's Health Response Team
- Developing ventilation and IAQ guidance and education for OSHA inspectors

Links to GUVI

- Part of OSTP interdepartmental working group on GUV

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

OPENING MODERATING PANEL

Organization:

GUVI's Most Pressing Issues Right Now

- Universal performance metric – under which conditions will GUV produce IAQ making fewer people sick
- Universal safety metric – UV dosing under which conditions is safe for workers
- Development of measurement techniques for the 2 issues above

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

OPENING MODERATING PANEL

Organization:

GUVI's Most Important Goals for the Next 10 Years

- OSHA is actively partnering with academic and governmental groups to support the development of performance and measuring standards

Pesticidal Devices
IUVA Americas Panel Meeting

September 28, 2022

Yvette S. Hopkins
Office of Chemical Safety and Pollution Prevention

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Pesticides vs Devices – FIFRA Authority

EPA, under FIFRA, enacted in 1948 has regulatory authority over both pesticides and devices.

- FIFRA defines a pesticide as "any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest…"

- FIFRA defines a device as "any instrument or contrivance (other than a firearm) that is intended for trapping, destroying, repelling, or mitigating any pest or any other form of plant or animal life… but not including equipment used for the application of pesticides when sold separately therefrom."

1976 Federal Register Notice Clarifications for Devices

- A device is an instrument or contrivance that works by physical means (such as electricity, light or mechanics.)
- Devices cannot contain a substance or mixture of substances intended to prevent, destroy, repel or mitigate any pest.
- EPA considers generators of pesticidal solutions when sold without substances to be devices, e.g., hypochlorous acid generator sold without salt.

Examples: fly traps, fly ribbons, black light traps, sound generators, air and water filters, carbide cannons, UV lights, ozone generators

Device vs. Pesticide Regulation

	Device	Pesticide
Comprehensive premarket review and registration	No	Yes
Submission/EPA review of public health efficacy data and claims	No	Yes
Labeling requirements (For devices – FIFRA Section 2q(1) and 40 CFR Part 156	Yes; (limited Agency feedback; No false or misleading claims)	Yes
Production requirements under FIFRA Section 7 and 40 CFR Part 167	Yes	Yes

Devices During the COVID-19 Pandemic

- Devices, like pesticides, cannot make claims against COVID-19, as that is a disease, not the pathogen which is SARS-CoV-2.
- Devices cannot be included on List N, which include only EPA-registered disinfectants for use against SARS-CoV-2.
  - EPA's Emerging Viral Pathogens Policy does not apply to devices, for this reason, surrogate pathogens cannot be used to support efficacy claims testing.
- To avoid being considered misbranded, pesticide devices must test using SARS-CoV-2 if the product claims to be effective against this virus.
- Device testing from open literature studies may not be referenced for efficacy as each device, pathogen and application scenario is unique.

Devices During the COVID-19 Pandemic (continued)

- Numerous products used to treat the air have come into the market during the pandemic; examples include UV light, photocatalytic products and plasma generators.

- New device hybrids include devices that also use registered pesticides, e.g., UV/application equipment for a registered pesticide and hand sanitizer.

- The pandemic highlighted drawbacks of no “level playing field” between devices and registered pesticide products.

Devices During the Covid-19 Pandemic - UV Light Products

- EPA has seen many UV light products with problematic claims.
  - Products make claims to kill microorganisms in seconds but do not discuss the distance to the surface, shadowed areas or the time needed for an effective treatment.
  - Concerns about radiation exposure, potential eye and skin damage. Federal agencies have received incident reports.
  - Many of these products make unsupportable claims, e.g., sterilization.
  - Concerns that people erroneously believe that devices that provide efficacy in the air also work equally on surfaces.

- EPA issued a compliance advisory on UV lights in 2020
  - https://www.epa.gov/compliance/compliance-advisory-epa-regulations-about-uv-lights-claim-kill-or-be-effective-against

- EPA's Office of Research and Development has tested some UV light products.
  - Link to ORD's 2021 webinar: https://www.epa.gov/emergency-response-research/covid-19-uv-c-devices-and-methods-surface-disinfection-webinar

EPA Coordination on UV Lights

- Internal coordination: the Office of Pesticide Programs (OPP) interacts with Office of Research and Development, Office of Air and Radiation and the Office of Water.
  - Enforcement assistance to the Office of Enforcement and Compliance Assurance and regional offices.
- Federal Coordination: OPP interacts most frequently with the Food and Drug Administration (devices and radiation safety), the Consumer Product Safety Commission and many other agencies related to the pandemic.
- State and tribal co-regulators.

Summary of Challenges:

- EPA faces many challenges in regulating devices because the current regulatory framework does not allow for pre-market review of product safety or efficacy claims and does not address the complexity of devices available on the market today.

- Resource constraints limit the ability to undertake regulatory changes at this time.

- Device products with claims to control SARS-CoV-2 have continued to expand during the pandemic.

Summary of Challenges:

- Public health consequences for insufficiently regulated devices.
  - Users may not use prudent disinfection processes if they believe they are protected by these technologies.
  - Users may believe they do not have to follow public health guidance, such as handwashing, wearing masks, social distancing, etc.

- Some devices may cause harm:
  - Some UV lights can cause burns of skin/eyes, skin cancer.
  - Some UV light devices generate ozone which can exacerbate asthma and chronic obstructive pulmonary disease.

EPA Resources for Devices:

- Subpart Z – Devices – 40 CFR Section 152.500
  https://www.govinfo.gov/content/pkg/CFR-2011-title40-vol24/pdf/CFR-2011-title40-vol24-sec152-500.pdf

- 1976 FRN - Pest Control Devices and Device Manufacturers (41 FR 51065)
  https://www.epa.gov/sites/production/files/2015-06/documents/frn-devices.pdf

- Pesticide Devices – A Guide for Consumers
  https://www.epa.gov/safepestcontrol/pesticide-devices-guide-consumers

- Pesticide Registration Manual: Chapter13 – Devices
  https://www.epa.gov/pesticide-registration/pesticide-registration-manual-chapter-13-devices

- Clarification for Ion Generating Equipment (72 FR 54039)
  https://www.federalregister.gov/documents/2007/09/21/E7-18591/pesticide-registration-clarification-for-ion-generating-equipment

- Compliance Advisory: What You Need to Know Regarding Products Making Claims to Kill the Coronavirus Causing COVID-19
  https://www.epa.gov/compliance/compliance-advisory-what-you-need-know-regarding-products-making-claims-kill-coronavirus

- Compliance Advisory: EPA Regulations About UV Lights that Claim to Kill or Be Effective Against Viruses and Bacteria
  https://www.epa.gov/compliance/compliance-advisory-epa-regulations-about-uv-lights-claim-kill-or-be-effective-against
- https://www.epa.gov/covid19-research

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

- *Panel 1: Infectious Diseases*

Background

- Hospital epidemiologist, Cleveland VA Medical Center
- Professor of Medicine, Case Western Reserve University

Links to GUVI

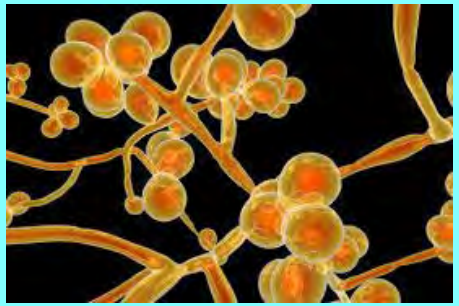
- 20+ years research on environmental transmission and disinfection, including UV-C, UV-A, and far UV surface and air decontamination

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

PANEL 1: INFECTIOUS DISEASES

GUVI's Most Pressing Issues Right Now

- *Candida auris*



- Environment is important
- Manual cleaning suboptimal
- UV-C effective

Why is UV not being used?

- Cost
- Ease of use
- Evidence
- CDC recommendations and practice guidelines

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

PANEL 1: INFECTIOUS DISEASES

GUVI's Most Important Goals for the Next 10 Years

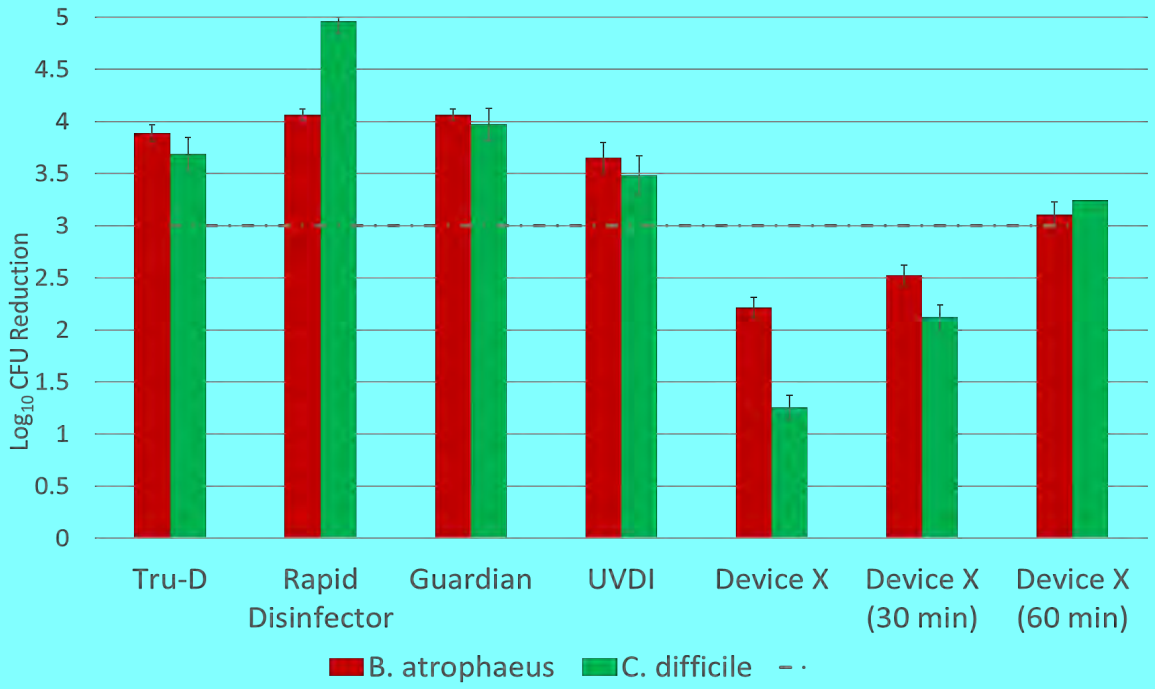
Do-it-yourself test protocol

-Commercial biological indicator spores

-Simple, standard exposure protocol

-Process in-house or send to commercial lab for testing

Reduction in spores using standard test protocol



- Compare devices
- Cost
- Evidence

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

PANEL 1: INFECTIOUS DISEASES

Trini Mathew, MD, MPH, FACP, FIDSA

CEO, HealthTAMCycle3 PLLC, MI

Associate Professor, Dept of Medicine, School of Medicine, Wayne State University and Oakland University William Beaumont, MI

Medical Director, Antimicrobial Stewardship Program and Infection Prevention and Epidemiology, Beaumont Taylor, MI

- **ID physician with 10+ years healthcare epidemiologist in both academic and community-based hospitals**
- **Collaborates with multidisciplinary teams and colleagues and has taught infectious diseases and infection prevention courses locally, regionally, and internationally (India) for physicians, midlevel, nurses, pharmacists and EMS. Also provides consultations on COVID-19 prevention for businesses/non healthcare industries**
- **Research interests are preventing health care associated infections, risk mitigation of outbreaks, promoting One Health, and optimizing vaccine uptake**
- **She is also actively working on improving diversity, equity and inclusion in healthcare settings**

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

PANEL 1: INFECTIOUS DISEASES

GUVI's Most Pressing Issues Right Now

- Infection prevention principles are the building blocks for safer healthcare delivery
- Challenges in resilient healthcare staffing and systems
- Turnover of staff/ EVS: requires frequent training and monitoring/ assessment of any drift in cleaning techniques
- Rise in antimicrobial resistance (AMR)/ novel pathogens
- Impact of climate change and spread of soil microbes with AMR (floods leading to soil erosions- with exposures and impacting plants/animals and humans)

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

PANEL 1: INFECTIOUS DISEASES

GUVI's Most Important Goals for the Next 10 Years

- Devices and tools that are automated (less prone to human errors/ drifts in human techniques)
- Need to tap into AI- gather data and provide real time feedback
- UV Devices that are safe in healthcare settings (both in acute care and in Long Term Acute Care and Skilled Nursing facilities
- Devices for other industries : travel and hospitality (global utilization to decrease spread of AMR through land transport/planes/ships)
- Devices for Community centers/places of worship/recreation/museums/music/opera (singing = airborne spread)
- Cost effective and access by communities currently faced with health inequities and limited access to healthcare

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

PANEL 1: INFECTIOUS DISEASES

- *Lyles School of Civil Engineering and Division of Environmental & Ecological Engineering, Purdue University*
- *XCMR, Principal Scientist for Process Engineering*

Background

- 30+ years of research/teaching: Env Engr
- Physico/Chemical Processes

Links to GUVI

- UV has been/is focus of research
- *Photochemical Reactors: Theory, Methods, and Applications of UV Radiation* (Wiley, October 2022)

blatch@purdue.edu

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

PANEL 1: INFECTIOUS DISEASES

Organization:

GUVI's Most Pressing Issues Right Now

- Lack of standards for design, validation/testing
  - Quantitative link between system characteristics and performance (risk-based approach)
- Optimization of UVC exposure
  - Disinfection vs. human exposure
- Need for new, efficient UVC sources
  - Higher output power, wavelength selection

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

PANEL 1: INFECTIOUS DISEASES

Organization:

GUVI's Most Important Goals for the Next 10 Years

- Develop standards for design, testing/validation
- Develop new, efficient UV sources
- Develop UV-based applications across scales

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

PANEL 1: INFECTIOUS DISEASES

Kate McPhaul, PhD, MPH, RN, Associate Research Professor
University of Maryland School of Public Health
Public Health Aerobiology and Biomarker Laboratory

kmcphaul@umd.edu

Background:

Former Chief Consultant Occupational Health
Veterans Health Administration

Links to GUVI

Co-Investigator: Public Acceptance and Communication Research, GUV
COVID Research Clinic with GUV (and PPE) for protection

- GUV appears to achieve most efficient air indoor air sanitation when compared to ventilation and filtration
- Role of indoor air and health is not understood by the public nor by public health and medical professionals
- Ventilation and GUV can be viewed as an "engineering control" using the occupational health paradigm, meaning it is not dependent upon behavior

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

PANEL 1: INFECTIOUS DISEASES

Organization:

GUVI's Most Pressing Issues Right Now

- Communication to the public about its effectiveness: Does it work?
- Communication about its safety: Is it safe? Even for children, older adults, the medically fragile and those who are immune compromised?
- Who should I believe when considering GUV?

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

PANEL 1: INFECTIOUS DISEASES

Organization:

GUVI's Most Important Goals for the Next 10 Years

- Scale up two-way processes for communicating with the public and medical community including their participation in evaluating GUV to achieve heathy indoor air and spaces
- Equity and Inclusion: Will everyone have access to GUV?
- Environmental Sustainability – Can GUV help reduce carbon emissions and other negative impacts on the environment?

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

PANEL 2: GUV DEVICE INDUSTRY LEADERS/SME

PRODUCTS/TECHNOLOGIES:

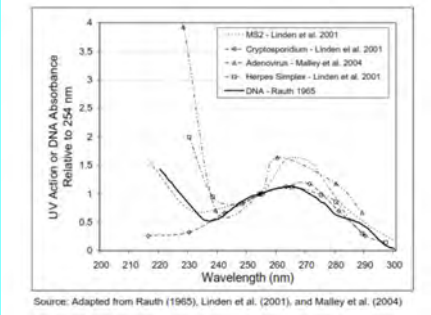
- *AIR STREAM & COIL DISINFECTION – HVAC Systems*
- *UPPER AIR DISINFECTION*
- *WHOLE ROOM SURFACE DISINFECTION*
- *SMALL OBJECT/MOBILE DEVICE DISINFECTION*
- *UVC SOURCES:*
  - *Low pressure Hg (254 nm)*
  - *Pulsed xenon (200-315 nm)*
  - *Far UV (222 nm)*
  - *UVC LEDs (254-280 nm)*

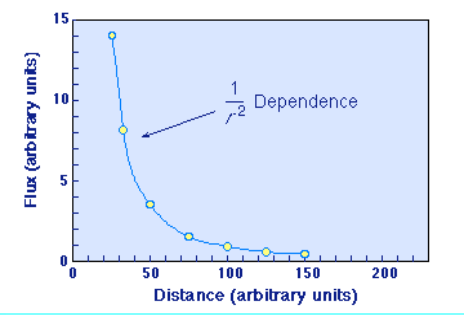
THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

PANEL 2: GUV DEVICE INDUSTRY LEADERS/SME

KEY PERFORMANCE/OPERATIONAL/SAFETY VARIABLES

- Microorganism Type
- Device output
- Lamp configuration
- Lamp wavelength, power, efficiency
- Wind chill/environmental factors: air flow speed, temperature, humidity
- Application protocols: Correct application of required dose
- Safety features for occupied and unoccupied spaces





THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

PANEL 2: GUV DEVICE INDUSTRY LEADERS

PANELISTS:

- Dr. Ashish Mathur: Vice President, Ultraviolet Devices
- Meredith Stines: President & CEO, American Ultraviolet
- Dr. Holger Claus: Vice President, Ushio America
- PJ Piper: President & CEO, FARUV Technologies
- Manjunath Anand: President & CEO, CleanSlate Technologies

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

PANEL 2: GUV DEVICE INDUSTRY LEADERS

Manufacturer: **AMERICAN ULTRAVIOLET**

Background

- Manufacturer of GUVI systems since 1960
- Upper Air, HVAC, Food & Beverage, Healthcare, Water treatment and many other GUVI solutions
- Manufacturer of industrial UV Curing systems

Links to GUVI

- Member of IUVA since it's beginning and member of ASHRAE, AHE, and many other organizations

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

PANEL 2: GUV DEVICE INDUSTRY LEADERS

Manufacturer: **AMERICAN ULTRAVIOLET**

GUVI's Most Pressing Issues Right Now

- Proper application of UVC for HVAC must be based on use case
  - Surface treatment of cooling coils and pass-by air disinfection have are not the same.
- In-Room Upper Air UVGI
  - Proper selection and sizing by manufacturers/reps
  - Safe installation of equipment by contractors (including post-install commissioning)
- "UV-in-a-box"
  - Public understanding of both benefits and limitations

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

PANEL 2: GUV DEVICE INDUSTRY LEADERS

Manufacturer: **AMERICAN ULTRAVIOLET**

GUVI's Most Important Goals for the Next 10 Years

- Integrating UVC-LED technology into HVAC and Upper Air as appropriate and as needed
- Understanding and properly applying 222nm technology as it continues to evolve for in-room air and surface applications
- Working together (manufacturers and regulatory bodies) to establish ***fair and effective*** standards for HVAC and Upper Air GUVI equipment and applications to ensure products actually do what they say and that all entries into these markets are held to the same standards.

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

PANEL 2: GUV DEVICE INDUSTRY LEADERS

Manufacturer: Ushio Inc.

Leading Manufacturer of Far UVC light sources and luminaires (Care222) – for air and surface disinfection

- extensive research (support) in FAR UVC
  - photobiological
  - Pathogen reduction

Links to GUVI

- member of various UVC related activities
-

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

PANEL 2: GUV DEVICE INDUSTRY LEADERS

Manufacturer: Ushio Inc.

GUVI's Most Pressing Issues Right Now

- Convincing (potential) customers why GUV is the right solu
  - FOR INFECTION CONTROL
  - TO MAKE SPACES HEALTHER
  - TO PROTECT SOCIETY
  - TO ACHIEVE ECONOMIC BENEFIT
- Getting (more) scientific (solid!) evidence that GUV
  - Can lower infection risk
  - Can be safely applied
  - Works for many concerning pathogens
- Better, collaborative, focused, trusting relationship with Regulatory stakeholders

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

PANEL 2: GUV DEVICE INDUSTRY LEADERS

Manufacturer: Ushio Inc.

GUVI's Most Important Goals for the Next 10 Years

- Active support and recognition by government (agencies) that GUV provides infection prevention
  - Is a viable technology
  - Is safe
  - Is "Green" = energy efficient
  - Should be implemented
  - Needs Education of the public
- Having Research results and (national and international) standards to substantiate above
- Getting government funding for R&D
- Light sources:
  - Getting higher efficiency and more reliable and cheaper (mW/$) UV-C LED
  - Getting shorter wavelengths
  - Ground breaking, new technologies???
- GUV becoming commodity

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

PANEL 2: GUV DEVICE INDUSTRY LEADERS

Manufacturer: Far UV Technologies, Inc.

Leading R&D and manufacturer of Far UV devices for air and surface disinfection since 2016

- Over 1,000 installations
- NASA, Air Force, NSNs, SDVOSB GSA, Coops






THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

PANEL 2: GUV DEVICE INDUSTRY LEADERS

Manufacturer: Far UV Technologies, Inc.

GUVI's Most Pressing Issues Right Now

- Increase Awareness of GUVI Advantages and Opportunity to Improve Indoor Air Quality with…
- Visible/Audible Support by Government

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

PANEL 2: GUV DEVICE INDUSTRY LEADERS

Manufacturer: Far UV Technologies, Inc.

GUVI's Most Important Goals for the Next 10 Years

- Near Term – Immediately Raise Awareness, Encourage and Actually Protect Public Facilities
- Medium Term – Enact Healthy Building Standards and Obtain Additional Funding
- Long Term – Reduce or Eliminate the Transmission of Infectious Disease

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

PANEL 2: GUV DEVICE INDUSTRY LEADERS

Manufacturer: CleanSlate UV

Biosafety company developing the next generation of intelligent sanitization solutions for mobile devices.

Mobile devices are the third hand we never wash!

Links to GUVI

- Member of Canadian Regulatory Working group

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

PANEL 2: GUV DEVICE INDUSTRY LEADERS

Manufacturer: CleanSlate UV

GUVI's Most Pressing Issues Right Now

- Not making the cut into the top or essential purchasing list
- Lack of recognition from regulators for organizations that implement GUV solutions
- Unclear guidance from regulations for the adoption of GUV solutions

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

PANEL 2: GUV DEVICE INDUSTRY LEADERS

Manufacturer: CleanSlate UV

GUVI's Most Important Goals for the Next 10 Years

- Make GUVI a standard of care in healthcare within the regulatory space
- Shift from supplementary sanitization to critical infection prevention tool
- Funding to healthcare institutions to adopt GUVI solutions

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

PANEL 2: GUV DEVICE INDUSTRY LEADERS

Manufacturer: Ultraviolet Devices Inc.

- Manufacturer of GUV products for air and surface disinfection
- 73 year history for UVC disinfection (started in water disinfection)
- Manufacturer of portable whole room UV disinfection device in use over 1100 hospitals in 27 countries

Links to GUVI

- IUVA
- ASHRAE (UV Technical Committees for Standards, Research, Handbook)

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

PANEL 2: GUV DEVICE INDUSTRY LEADERS

Manufacturer:Ultraviolet Devices Inc.

GUVI's Most Pressing Issues Right Now

- Limited customer knowledge and understanding about UV value proposition
- Lack of industry test and performance standards for whole room UV disinfection
- Wild wild west scenario resulting in confusion and skepticism arising from a variety of companies offering UV products with unsubstantiated claims, and potentially unsafe devices
- Limited guidance from healthcare professional organizations regarding the application of UV in healthcare settings

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

PANEL 2: GUV DEVICE INDUSTRY LEADERS

Manufacturer: Ultraviolet Devices Inc.

GUVI's Most Important Goals for the Next 10 Years

- Guidance from government and healthcare agencies supporting GUV for infection prevention
- Having (national and international) standards to drive device selection and adoption
- Paradigm shift from an optional disinfection technology to a standard infection prevention tool in a layered approach

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

PANEL 3: OUR SISTER ASSOCIATIONS

Organization: ASHRAE

Background

- An international technical society (founded1894) with ~52,000 members in over 132 countries (79% US/Canada)
- Mission: To serve humanity by advancing the arts and sciences of heating, ventilation, air conditioning, refrigeration and their allied fields.
- Education, research, standards, advocacy

Links to GUVI

- TC 2.9 Ultraviolet Air and Surface Treatment (2005)
- Handbook Chapters, articles, meeting programs
- Research
- Standards and guidelines (Standards 185.x, Guideline 37P)

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

PANEL 3: OUR SISTER ASSOCIATIONS

Organization: ASHRAE

GUVI's Most Pressing Issues Right Now

- Status of application-relevant standards/certifications for equipment effectiveness and safety
- Hard to know who is a qualified provider
- Methods and tools for application

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

PANEL 3: OUR SISTER ASSOCIATIONS

Organization: ASHRAE

GUVI's Most Important Goals for the Next 10 Years

- Certified products with verifiable performance in application
- Well-trained, credentialed workforce
- IAQ standards that address infection risk

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

PANEL 3: OUR SISTER ASSOCIATIONS

Organization: IEC TC 34/WG 23

Background

- IEC TC 34/WG 23 was formed based on the results of research conducted by an advisory group TC 34/AG 17 in 2021
-

Links to GUVI

- IEC standards are used towards certification and or complying with various country regulations
- Provides a consensus approach to creation of safety, performance, and similar requirements

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

PANEL 3: OUR SISTER ASSOCIATIONS

Organization: IEC TC 34/WG 23

GUVI's Most Pressing Issues Right Now

- To prepare and maintain deliverables (standards and similar) specific to UV radiation for germicidal products within TC 34 scope
- To monitor the activities of the IEC and ISO committees related to UV radiation for germicidal products
- Currently working on IEC standards for Fixed and portable lighting products, cabinet type germicidal products, and UV sources (e.g. Lamp or LEDs

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

PANEL 3: OUR SISTER ASSOCIATIONS

Organization: IEC TC 34/WG 23

GUVI's Most Important Goals for the Next 10 Years

- There is no defined 10-year goal as this is a standards development organization that develops and maintain IEC standards that is needed by the industry. Standards are constantly under creation/revision.

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

PANEL 3: OUR SISTER ASSOCIATIONS

Organization:ISO/TC142 Cleaning equipment for air and other gases

SCOPE: Standardization in the fields of terminology, classification, characteristics, and test and performance methods for air and gas cleaning and disinfecting equipment for general ventilation and industrial applications.

Committee Manager: Mrs Anna Martino **Chairperson :** Mr Riccardo Romanò

ISO/TC142/WG2 *Cleaning equipment for air and other gases/UV-C technology* **Convenor :** Prof. Yongheng Huang

PUBLISHED ISO STANDARDS

ISO 15858-2016 *UV-C Devices—Safety information—Permissible human exposure*

ISO 15724-2019 *UV-C Devices—Measurement of output of UVC lamp*

ISO 15714-2019 *Method of evaluating the UV dose to airborne microorganisms transiting in-duct ultraviolet germicidal irradiation devices*

ISO/TC142 External liaisons

CIE International Commission on Illumination

IUVA The International Ultraviolet Association

ETN European Turbine Network

EUROVENT European Committee of Air Handling and Refrigeration Equipment Manufacturers

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

PANEL 3: OUR SISTER ASSOCIATIONS

Organization:ISO/TC142 Cleaning equipment for air and other gases

Most Pressing Issues Right Now

1. Traditional UV-C lamps contain mercury

"The Minamata Convention on Mercury" has drawn out a list of restrictions on mercury emissions, proposed to reduce the emissions and use of mercury, and traditional UV-C mercury lamps will be restricted, banned from production and use, and gradually withdrawn from the market.

2. The output power of the LED UV lamp is not enough

The current UV LED radiation efficiency is low, generally 3%-5%, only 1/10 of the traditional UV mercury lamp, completely unusable in high-power sterilization occasions.

3. Far-ultraviolet rays have no damage to the human body, but the experimental data is not enough

Irradiation safety is related to human health. Although a large number of studies have proved the irradiation safety of far UV-C, the current application of far UV-C (especially direct long-term skin and eye exposure) still needs to be cautious.

The current research should further confirm the safety of its radiation theoretically and experimentally, and gradually increase the dose threshold for the safe use of far UV-C on the basis of the existing experimental evidence.

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

PANEL 3: OUR SISTER ASSOCIATIONS

Organization:ISO/TC142 Cleaning equipment for air and other gases

"Breathing clean air" is a fundamental human right, and enabling all people to live in a healthy environment with equality and dignity is one of ***The goal of the 2030 Agenda for Sustainable Development*.**

According to the World Health Organization, indoor air pollution kills 4.3 million people globally each year, while outdoor air pollution kills 3.7 million.

ISO has published international standards for UV disinfection, providing a comprehensive solution to indoor air pollution and an important means to achieve the goal of "breathing clean air".

Most Important Goals for the Next 10 Years

1. How to use new disruptive technologies such as artificial intelligence, cloud computing, robotics, additive manufacturing (3D printing) and the Internet of Things to change traditional UV-C systems?

2. How to improve the UV-C output power of UV LED?

3. How to solve the human-machine coexistence of far UV-C?

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

PANEL 3: OUR SISTER ASSOCIATIONS

Organization: **National Electrical Manufacturers Association, NEMA, Lighting Systems Division**

Background

- NEMA represents some 325 electrical equipment and medical imaging manufacturers that make safe, reliable, and efficient products and systems. NEMA's combined industries account for 370,000 American jobs in more than 6,100 facilities covering every state. NEMA's industry produces $130 billion shipments of electrical equipment and medical imaging technologies per year with $38 billion exports.

Links to GUVI

- Members manufacture UV lamps, luminaires and components used for UVGI products.
- Members involved in all aspects of lighting-related standards development including UVGI.

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

PANEL 3: OUR SISTER ASSOCIATIONS

Organization: **National Electrical Manufacturers Association, NEMA, Lighting Systems Division**

GUVI's Most Pressing Issues Right Now

- Market not developing, still niche
- Persistent safety concerns and perceptions about 'radiation'
- Inconsistent regulatory approaches & enforcement
- Inconsistent standards & guidelines
- "Wild West" with claims in marketplace
- Missed window of opportunity; "pandemic 'over' but standards not yet fully in place. Many customers have adopted nonchalant attitude re: necessity.
- No requirements in building codes, despite WHO pushing

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

PANEL 3: OUR SISTER ASSOCIATIONS

Organization: **National Electrical Manufacturers Association, NEMA, Lighting Systems Division**

GUVI's Most Important Goals for the Next 10 Years

- Full set of standards in place including standards for germicidal efficacy of products
- Requirements in building codes including IAQ
- Put safety concerns/perceptions to rest
- Consistent regulatory approach/framework
- Education and training for professionals

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

PANEL 3: OUR SISTER ASSOCIATIONS

Organization: Illuminating Engineering Society (IES)

Background

- The IES Photobiology Committee has written UV standards for decades
- The IES writes American National Standards (ANSI) for lighting

Links to GUVI

- Multiple GUV standards, including RP-44, LM-92 and LM-93 from 2021/2022 https://www.ies.org/standards/
- IES CR-2-20-V1, Germicidal Ultraviolet (GUV) https://media.ies.org/docs/standards/IES%20CR-2-20-V1a-20200507.pdf
- Multiple additional webinars, articles and educational content can be found at https://www.ies.org/education/

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

PANEL 3: OUR SISTER ASSOCIATIONS

Organization: Illuminating Engineering Society (IES)

GUVI's Most Pressing Issues Right Now

- Address poor GUVI products by achieving industry agreement on minimum performance requirements
- Establish an industry certification to assure a minimum level of competence for GUVI installers.
- Unify and simplify GUVI by aligning influential relevant industry groups like IUVA, DOE, IES, ASHRAE, IALD & NALMCO on key GUVI issues

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

PANEL 3: OUR SISTER ASSOCIATIONS

Organization: Illuminating Engineering Society (IES)

GUVI's Most Important Goals for the Next 10 Years

- Educate more installers and distributors
- Increase radiant efficiencies for UV-B and UV-C LEDs and retrofit products for existing lamp shapes (assuming LEDs provide advantages beyond being environmentally friendly).
- Achieve Federal DOE regulations (CCMS Database) for GUVI minimum requirements to remove ineffective and unsafe products from the marketplace.

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

PANEL 3: OUR SISTER ASSOCIATIONS

Organization: IUVA, Board of Directors

Background

- Professor, Internal Medicine and Pediatrics, Infectious Diseases
- Medical Director, Infection Prevention, Yale New Haven Health

Links to GUVI

- GUVI for the prevention of transmission of respiratory pathogens and healthcare associated infections
- GUVI for surface disinfection

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

PANEL 3: OUR SISTER ASSOCIATIONS

Organization: IUVA, Board of Directors

GUVI's Most Pressing Issues Right Now

- Consensus methods for the measurement of the effectiveness of GUVI for the disinfection of surfaces and air
- Development of consensus methods for communicating the capabilities of GUVI which accurately reflect GUVI benefits and limitations
- Ensuring GUVI is increasingly recognized as a key element for comprehensive programs to create safer, more energy efficient built environments

THE GUVI SECTOR -- WHERE ARE WE & WHERE ARE WE GOING IN NEXT 10 YEARS

PANEL 3: OUR SISTER ASSOCIATIONS

Organization:

GUVI's Most Important Goals for the Next 10 Years

- Improve GUVI technologies allowing improved power, efficiency and wavelength selection
- Integrate GUVI into built environment designs
- Develop a more complete understanding of the role for GUVI in disinfection and health of the public