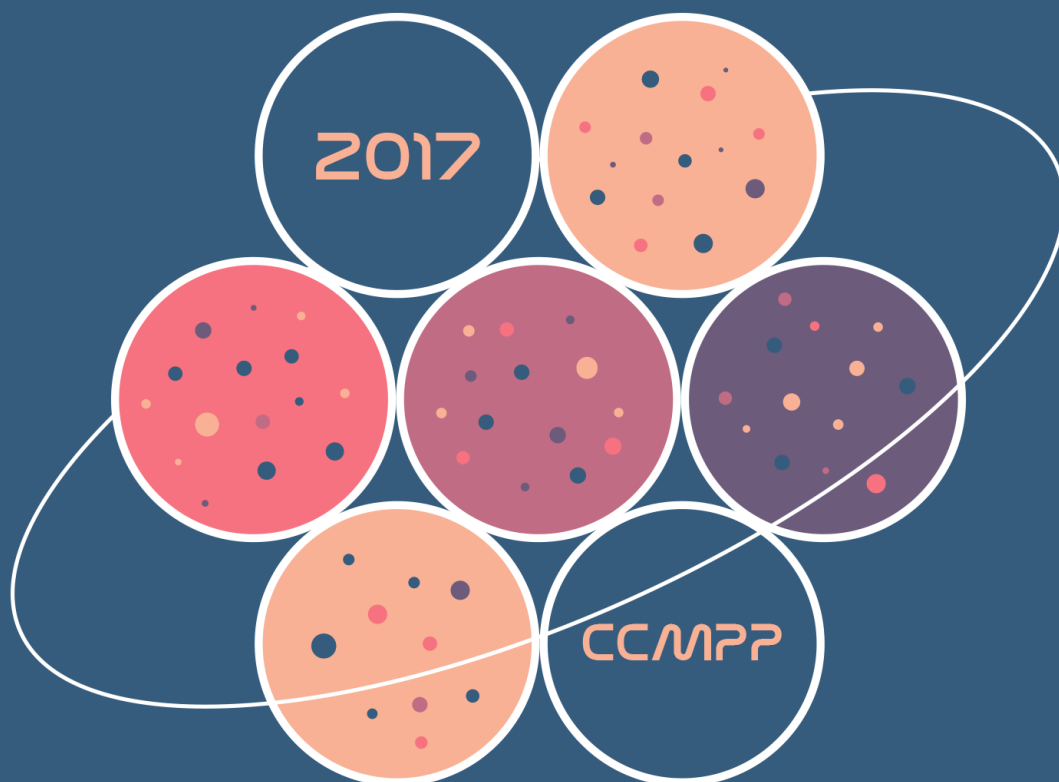


## 2017 Contamination, Coatings, Materials, and Planetary Protection Workshop

NASA GODDARD SPACE FLIGHT CENTER | GREENBELT, MARYLAND, USA | JULY 18-20, 2017

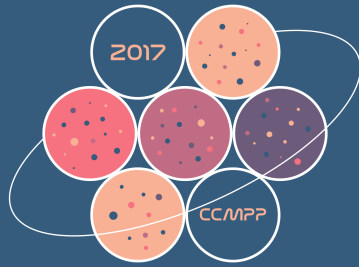
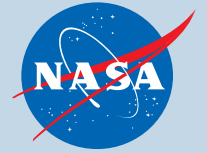


# AGENDA

Workshop Co-Chairs:

Jillian Pulia | [jillian.n.pulia@nasa.gov](mailto:jillian.n.pulia@nasa.gov) | 301-286-7852

Kathryn Handler | [kathryn.a.handler@nasa.gov](mailto:kathryn.a.handler@nasa.gov) | 301-286-8211



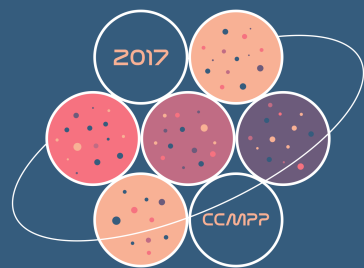
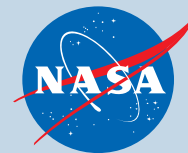
## 2017 Contamination, Coatings, Materials, and Planetary Protection Workshop

NASA GODDARD SPACE FLIGHT CENTER | GREENBELT, MARYLAND, USA | JULY 18-20, 2017

# DAY 1: TUESDAY, JULY 18<sup>TH</sup> 2017

## MORNING AGENDA

<b>7:00 am</b>	<b>NASA Badging Opens</b> <i>US Citizens: Visitor Center   Foreign Nationals: Front Gate</i>
<b>7:15 am</b>	<b>Registration Opens</b> <i>Building 34 Main Lobby</i>
<b>8:00 am</b>	<b>Opening Remarks</b>
<b>8:10 am</b>	<b>Session 1: Contamination Mitigation Techniques</b> <i>Session Chair: Peter Teague (Sierra Lobo)</i>
8:10 am	Feasibility Study of Raman Spectroscopy as an In Situ Mitigation Method for Molecular Contamination on Spacecraft <i>Gugu N. Rutherford (NASA Langley)</i>
8:30 am	How Clean is Clean? - Removing Particulates and Multiple Soils from Electronics and Aerospace Components <i>David A. Ferguson (microCare)</i>
8:50 am	Contamination Mitigation Strategies for Long Duration Human Spaceflight Missions <i>Ruthan Lewis, PhD (NASA Goddard)</i>
9:10 am	External Contamination Environment at ISS (Including Selected Results from Payloads Contamination Mapping) <i>Courtney Steagall (Boeing)</i>
9:30 am	Noncontact Acoustic Forces for Surface Decontamination <i>Sameh Wanis, PhD (Northrop Grumman)</i>
<b>9:50 am</b>	<b>Break</b>
<b>10:00 am</b>	<b>Session 2: Lessons Learned &amp; Industry Capabilities</b> <i>Session Chair: Erin Lalime (SGT Inc)</i>
10:00 am	Inspection of the CRES FM-6 Shortwave Filter at Satellite Integration Level with Portable Raman Spectroscopy <i>Elaine Seasley (NASA Langley)</i>
10:20 am	OSIRIS-REx Contamination Control and Contamination Knowledge Lessons Learned <i>Chris Lorentson (NASA Goddard)</i>
10:40 am	DLR Vacuum Test Facility for Thruster Plume Investigation <i>Martin Grabe (DLR Göttingen)</i>
11:00 am	NASA Launch Services Program CC/PP Support <i>Linda Matthias (Analex)</i>
11:20 am	It is Rocket Surgery: Utilizing NASA Student Programs for Contamination Control Outreach Efforts <i>Elaine Seasley (NASA Langley)</i>
<b>11:40 am</b>	<b>Break</b>



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# DAY 1: TUESDAY, JULY 18<sup>TH</sup> 2017

## AFTERNOON AGENDA

### 12:00 pm **Lunch Session: Sources and Solutions to Contamination Issues in Space Simulation (TVAC) Systems**

*J.R. Gaines (Kurt J. Lesker)*

### 1:00 pm **Session 3: Materials Processing & Characterization**

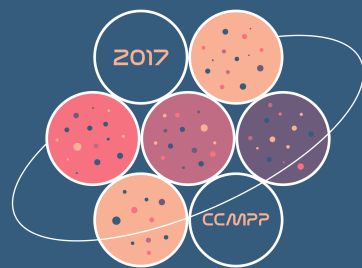
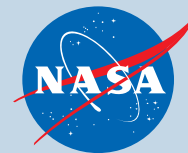
*Session Chair: Jelila Mohammed (NASA Goddard)*

1:00 pm Color Camera Pyrometry to Probe Spatiotemporal Burn Characteristics of Energetic Nanomaterials  
*Dylan J. Kline (UMD)*

1:20 pm Functionalizing Metallic Surfaces Using Femtosecond Laser Surface Processing  
*Craig Zuhlke, PhD (UNL)*

1:40 pm Materials Characterization for Contamination Mitigation on SHERLOC  
*Qian Nataly Chen (JPL)*

2:00 pm Cleaning and Cleanliness Measurements of Additive Manufactured Parts  
*Kevin Edwards (NASA Marshall)*



## 2017 Contamination, Coatings, Materials, and Planetary Protection Workshop

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# DAY 2: WEDNESDAY, JULY 19<sup>TH</sup> 2017

## MORNING AGENDA

### 8:00 am Registration Opens

*Building 34 Main Lobby*

### 9:00 am Opening Remarks

### 9:10 am Session 4: Planetary Protection for Missions

*Session Chair: Lauren Mosier (SGT Inc)*

9:10 am The Compatibility of Conformal Coating with Vapor Hydrogen Peroxide Sterilization: Protecting the Icy Jovian Moon Europa from You!  
*Caitlin Phillips (APL)*

9:30 am Sterile Handling of Mars Organic Molecular Analyzer Mass Spectrometer After Dry Heat Microbial Reduction  
*Erin Lalime, PhD (SGT Inc)*

### 9:50 am Break

### 10:00 am Session 5: Contamination Considerations for Vacuum

*Session Chair: Elaine Stewart (NASA Goddard)*

10:00 am A New Approach for QCM TGA Measurements in Dynamic Outgassing Measurements  
*Orcun Ergincan, PhD (ESA)*

10:20 am Evaluation Results of New Contamination Sensor "Twin-CQCM" Developed by Japanese Manufacturer  
*Yuta Tsuchiya (JAXA)*

10:40 am Thermal Vacuum Chamber Repressurization with Instrument Purging  
*Michael Woronowicz, PhD (SGT Inc)*

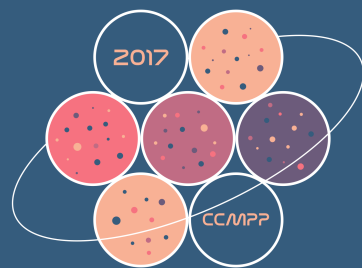
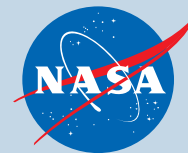
11:00 am Numerical Investigation of Chamber Repressurization  
*Lubos Brieda, PhD (Particle In Cell)*

11:20 am The History of Venting, Part 1  
*Stephen Leiter (NASA Goddard)*

### 11:40 am Break

### 12:00 pm Keynote Presentation: The James Webb Space Telescope Mission

*Matthew Greenhouse, PhD (NASA Goddard)*



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# DAY 2: WEDNESDAY, JULY 19<sup>TH</sup> 2017

## AFTERNOON AGENDA

**1:00 pm**

### **Session 6: Materials Testing**

*Session Chair: Olivia Landgrover (NASA Goddard)*

1:00 pm

Space Flight Materials in the Jovian Environment

*Ryan S. Tillman (APL)*

1:20 pm

US National Committee Proposed Revision to the ISO Laser Damage Standard

*Michael Thomas (Spica Tech)*

1:40 pm

Addressing Material Challenges for the Europa Clipper Project

*Nora Low (JPL)*

2:00 pm

Synthesis and Testing of Coated Carbon Nanotube Composite Microstructures

*Carly Sandin (NASA Goddard)*

**2:20 pm**

### **Break**

**2:30 pm**

### **Session 7: Contamination Modeling**

*Session Chair: Lubos Brieda (Particle In Cell)*

2:30 pm

Mars 2020 Sample Cleanliness Molecular Transport Model

*Ira Katz (JPL)*

2:50 pm

Overview of JAXA's Contamination Research Activities

*Kazunori Shimazaki, PhD (JAXA)*

3:10 pm

A Semi-Empirical Method for the Prediction of Molecular Contaminant Film Accumulation

*Jonathan Arenberg, PhD (Northrop Grumman)*

3:30 pm

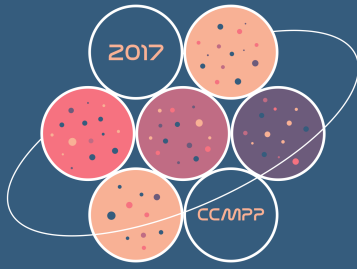
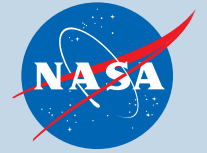
Multivariate Analysis of E-1559 Temperature Programmed Desorption

*Robert M. Moision (The Aerospace Corp)*

3:50 pm

Column Number Density Expression Through  $M=0$  and  $M=1$  Point Source Plumes Along Any Straight Path

*Michael Woronowicz, PhD (SGT Inc)*



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**DAY 3: THURSDAY, JULY 20<sup>TH</sup> 2017**  
**MORNING AGENDA**

**8:00 am Registration Opens**

*Building 34 Main Lobby*

**9:00 am Opening Remarks**

**9:10 am Session 8: Cleanroom Contamination Impacts**

*Session Chair: Randy Hedgeland (NASA Goddard)*

9:10 am Impact of Cleanroom Operation on Contamination Risk

*Koos Agricola (Technology of Sense)*

9:30 am Real Time Monitoring - What Compromises a Real-Time Monitoring System

*Jason Kelly (Lighthouse Worldwide Solutions)*

9:50 am Fall Out Predictions Are Not 100% Fool-Proof: A Study on the Variables Affecting Particle Fall Out Predictions

*Carol Nguyen (Boeing), Eleazar Lontoc (Boeing)*

**10:10 am Break**

**10:20 am Session 9: Planetary Protection in Cleanrooms**

*Session Chair: Therese Errigo (NASA Goddard)*

10:20 am Best Practices and Protocols in Cleanroom Processing for Contamination and Biological Sensitive Spacecraft  
*Taguhi Arakelian (JPL)*

10:40 am Controlling Fungal and Bacterial Spores in Cleanrooms and Controlled Areas

*Jim Polarine Jr. MA (STERIS Corp)*

11:00 am The Development of a Practical Approach to Assess Cleanrooms for Biological Contamination to Minimize Hardware Recontamination Risk

*J. Benardini (JPL)*

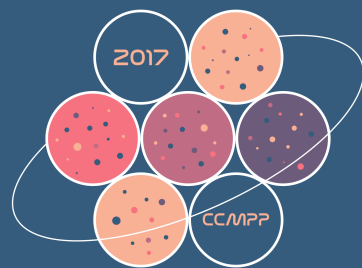
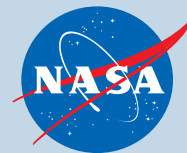
11:20 am Hands-On Planetary Protection Demo Results

*Erin Lalime, PhD (SGT Inc)*

**11:40 am Break**

**12:00 pm Lunch Session: The Changing World of Cleanroom Standards: Updates to ISO 14644-1 and ISO 14644-2**

*Jason Kelly (Lighthouse Worldwide Solutions)*



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# DAY 3: THURSDAY, JULY 20<sup>TH</sup> 2017

## AFTERNOON AGENDA

**1:00 pm**

### **Session 10: Coatings**

*Session Chair: Dylan J. Kline (NASA Goddard/UMD)*

1:00 pm

An Introduction to Atomic Layer Deposition

*Vivek Dwivedi, PhD (NASA Goddard)*

1:20 pm

Electron Beam Generated Plasmas: Ultra Cold Sources for Atomic Layer Processing

*Scott Walton, PhD (NRL)*

1:40 pm

Application of Molecular Adsorber Coatings in Chamber A for the James Webb Space Telescope

*Nithin Abraham (NASA Goddard)*

2:00 pm

Surface Structure Analysis of Atomic Oxygen Protective Coating Film

*Yugo Kimoto, PhD (JAXA)*

2:20 pm

Effect of Concurrent UV Irradiation and Contamination on Silver Coated Teflon Radiator Surface

*De-Ling Liu, PhD (The Aerospace Corp)*

**2:40 pm**

### **Break**

**2:50 pm**

### **Session 11: Contamination Control Methods**

*Session Chair: Ray LeVesque (SGT Inc)*

2:50 pm

Contamination Analysis and Identification by Vibrational Spectroscopy

*Matt Bartucci, PhD (Thermofisher)*

3:10 pm

Continuous Particle Fall Out Monitoring With High Resolution Silicon Sensors

*Karen Holland (XCAM Ltd)*

3:30 pm

Field Experiences with the APMON Particle Deposition Monitor

*Jan Gerbrands (Technology of Sense)*

3:50 pm

Use of Vacuum Degreasing for Precision Cleaning

*Eric Fox, PhD (NASA Marshall)*

4:10 pm

In-situ Performance Evaluation of Contaminated Optical Surfaces

*Bruno Bras (ESTEC/ESA)*

**4:30 pm**

### **Closing Remarks**