



## **Workshop 3: Advanced Mechanical Ventilation — Precision and Personalized Support**

Mechanical ventilation is the most common life-support intervention in the ICU, yet it is also a major driver of iatrogenic lung and diaphragm injury. The 2026 workshop on Advanced Mechanical Ventilation moves beyond basic "Assist Control" settings to embrace a physiology-guided, personalized approach to respiratory failure.

### **The Physiological Shift: Lung and Diaphragm Protection**

By 2026, the paradigm of "Lung-Protective Ventilation" has expanded into "Lung- and Diaphragm-Protective Ventilation". This recognition stems from the "WEAN-SAFE" and "WIND" studies, which highlighted that both excessive and insufficient respiratory effort during ventilation lead to poor outcomes, including Ventilator-Induced Diaphragmatic Dysfunction (VIDD).

Furthermore, the quantification of risk has evolved. Clinicians are now taught to monitor "Mechanical Power" (MP), a comprehensive measure of the energy transferred to the lung per minute. The formula for MP integrates tidal volume, driving pressure, and respiratory rate, providing a more accurate predictor of mortality than any single parameter.

### **Aims and Clinical Objectives**

The goal of this workshop is to provide clinicians with the tools to tailor ventilation to the individual patient's lung mechanics and physiological state.

- Identification of regional lung heterogeneity using Electrical Impedance Tomography (EIT) and lung ultrasound (LUS) to optimize PEEP and prevent "atelectrauma".
- Mastery of "Driving Pressure" (Delta P) monitoring, the most critical predictor of outcome in ARDS, and its use in titrating tidal volumes.
- Implementation of advanced monitoring techniques, such as esophageal manometry, to measure transpulmonary pressure and avoid excessive lung stress.
- Diagnosis and management of Patient-Ventilator Asynchrony (PVA) through waveform analysis.
- Utilization of "heart-lung-diaphragm" ultrasound to guide the liberation from mechanical ventilation and predict weaning success.

### **Program Schedule: Advanced Mechanical Ventilation (09:00 AM – 01:00 PM)**

The program focuses on high-level physiological maneuvers and the use of modern monitoring equipment.



<b>Time</b>	<b>Session Title</b>	<b>Focus and Key Components</b>
09:00 - 09:40	The Precision Frontier: MP and VILI	Why "6ml/kg" is not enough; Understanding Mechanical Power and regional strain.
09:40 - 10:30	Skill Station 1: Driving Pressure and Compliance	Bedside maneuvers; Calculating Delta P and C <sub>rs</sub> ; Adjusting for the "Baby Lung".
10:30 - 11:15	Skill Station 2: EIT and Regional Aeration	Real-time imaging of lung recruitment using EIT systems.
11:15 - 11:30	Networking & Closed-Loop Tech Demo	Exploring "Intelligent-ASV" and adaptive control algorithms with sponsors.
11:30 - 12:15	Skill Station 3: Esophageal Manometry	Measuring transpulmonary pressure; Setting PEEP in the "Stiff Chest Wall" patient.
12:15 - 12:45	Skill Station 4: Diaphragm Ultrasound and Weaning	Measuring thickening fraction (DTF) and excursion to prevent VIDD.
12:45 - 13:00	Discussion: AI and Machine Learning	How automated systems will handle oxygenation and weaning in the near future.