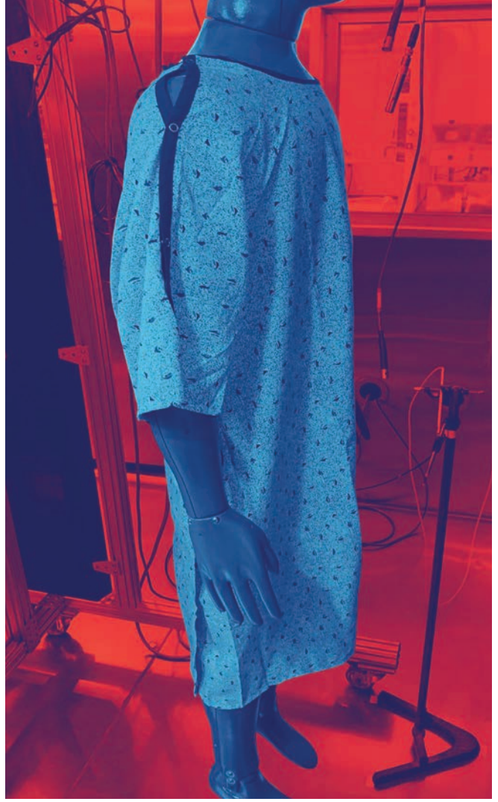

Testing the thermal resistance of a patient gown using a thermal sweating manikin in Bruner Materials Characterization Laboratory.

A Design for Mitigating Patient Hypothermia

General anesthesia during surgery can impair the body's autonomic temperature regulation and lead to patients having dangerously low body temperature. That, in turn, increases an array of clinical risks, including poor wound healing and infection, excess blood loss, cardiac arrhythmias and impaired renal function. Unfortunately, current surgical gowns—which have very little thermal capability—provide no significant protection against heat loss.

For that reason, a cross-disciplinary team of Jefferson students and faculty—with expertise in anesthesiology, mechanical engineering, textile engineering, textile technology and fashion design—is creating a new type of patient garment that is intended to mitigate the problem of surgically related hypothermia.

"Our goal is to design a cost-efficient patient gown that provides thermal insulation before, during and after surgery," explains **Ryan Masoodi, PhD**, associate professor of mechanical engineering, who leads the development team with anesthesiologist **Adam Thaler, DO**. Dr. Thaler notes, "In a typical surgery, when patients go from the operating room to post-anesthesia care, we usually use approximately 10 blankets to keep each one warm. Our group thinks there must be an approach that is both more effective and efficient." For example, one approach the team is considering: a multi-layered reusable gown that binds a layer of infrared material—intended to reflect heat back onto the patient's body—between a fabric inner layer and a woven polyester outer layer.

"As a multifaceted team backed by technical resources such as the Bruner Materials Characterization Laboratory and the Textiles Engineering program, we have the capability to solve a problem that is universal across hospitals," says mechanical engineering undergraduate **Lexi Patania**. Her fellow mechanical engineering major **Jenna Yorko** adds, "If we are successful, this product has the potential to be put into use in operating rooms throughout the world."

Having completed preliminary research on the clinical challenges and on the limitations of current approaches to combatting hypothermia, the team developed a design-planning process that is the basis for a grant application now being reviewed by the National Institutes of Health. ■