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Letter From the Editor

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Letter From the Editor



Welcome back to *NCSLI Measure: The Journal of Measurement Science*.

Emotion. Like everyone else, metrologists use emotion in life. Many pursue their work or other interests with passion, inspiration and joy, which correlate with success. Emotions give life quality, important enough that the United States Declaration of

Independence called pursuit of happiness a fundamental right. As life aids, our subconscious pattern-recognition machines quickly evaluate a situation and generate a feeling, such as an extreme fight-or-flight response or everyday emotions associated with a person, sound, smell or other percept. Our intuition generates hunches, gut feelings, or hypotheses to investigate more rigorously. And don't forget those eureka moments when our subconscious solves a problem as if by revelation.

Emotion, though, has zero cognitive value. Intensity of conviction does not equate to evidence, much less proof. Aristotle defined man as the rational animal. Instinct, intuition, and emotion alone leave us less than human; only complex reasoning separates us from all other creatures; only rational thought solves complex problems. Unfortunately, we do not behave rationally, or even think, automatically; we only reason when we consciously choose to do so.

You will find reasoned measurement approaches in *Measure*. This issue continues our new content mix from different metrology perspectives, bringing you one measurement science and four measurement engineering pieces. In the former, Collin Delker, Elizabeth Auden and Otis Solomon of the US Department of Energy's Primary Standards Laboratory bring a new approach to interval analysis, an important subject. Uncertainty analyses should account for drift after calibration, something *NCSLI RP-1* calls uncertainty growth. Also, interval analysis "closes the loop" on uncertainty analysis—if we issue under- or overestimated measurement uncertainties, then observed in-tolerance and metrological equivalence probabilities will not match the assigned confidence levels. You may use that feedback to refine uncertainties and intervals.

In the first measurement engineering paper, Keysight's Michael Dobbert proposes smart instruments that report their measurement uncertainties along with measured values—instruments that actually produce what the VIM defines as

measurement results—and demonstrates the value such instruments would provide. If you follow the *Metrologist's* "Toward a Measurement Information Infrastructure" column you will also see the synergy this idea might create between smart instruments and other metrology computing systems.

Next, Steven Yang and Y. C. Chau of Hong Kong's Standards and Calibration Laboratory (SCL) provide us a measurement process design to calibrate residual-current-device (RCD) testers. RCDs, sometimes called ground-fault current interrupters, protect life from electrical shock, so testing their correct operation carries obvious weight. Following that, Efrem Ejigu argues the benefits of eutectic fixed points for radiation thermometry up to 3500°C at the National Metrology Institute of South Africa. George Tang, Zoie Tse, and Henry Chiu, also of SCL, wrap up with an innovative coordinate measuring machine (CMM) calibration method applicable when the CMM dimensions exceed your step-gauge standard's length.

Metrologists know to gather all available data before reaching a conclusion and to obtain more if the value justifies the expense, that any given observation does not tell the whole story and may even lead us to the wrong idea, and that every measurement decision entails risk to evaluate before taking action. We calibrate to reduce the uncertain measurement bias that drives decision risk.

We typically do not know our own personal biases because a lifetime of uncontrolled and uncalibrated ad hoc inputs program our subconscious emotional computers. Like an artificial neural network, our subconscious operates obscured inside a black box. However, rationally comparing our emotional reactions and intuitive judgments to reality constitutes a feedback loop with which to control and calibrate our intuitive measurement system, albeit with a long time constant. Unless and until we so refine our biases, acting upon emotions remains irrational in direct proportion to consequences and speed. As we stop and labor to think first, we set the world a human example.

Sincerely,
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► HOW TO REACH US

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