

Future Trends in I&M

This is my first column on the “Future Trends in I&M,” and let me thank you, first of all, for your patience in reading the column and the editor-in-chief of this magazine, Dr. Wendy van Moer, for giving me this opportunity. When she first contacted me and asked me to contribute to the *Instrumentation and Measurement Magazine* on a regular basis, I was amazingly surprised and asked her why she selected me for a column that requires an insight into the I&M field that I do not feel I have. Wendy’s answer was even more surprising than the original proposal. She selected me because I’m one of the recipients of the IEEE Instrumentation and Measurement Society Outstanding Young Engineer Award, and as such, I should be, in her opinion, young and brilliant.

To tell you the truth, I do not feel as young and brilliant as I was in 2005 when I received the Award... but, can we contradict the boss? Of course we can’t (especially if the boss has a very high opinion of us)! So, here I am, trying to find an answer to the big question: how can I serve the *Instrumentation & Measurement Magazine* at best? How can I even imagine that my opinions on the future of I&M, as the opinions of a single person, will interest you?

I agree with Wendy that young and brilliant people are the future of I&M (as of any other field), and their ideas about the future of I&M are surely interesting. On the other hand, a single young person is always *one* person, and his or her ideas represent only one personal perspective. On top of this, *youth* surely means enthusiasm, but also lack of experience. However, the limited experience of many enthusiastic people may provide different points of view and eventually sketch an interesting picture of the future trends in I&M. Therefore, I’m not planning to run the show by myself only, and I will ask other young and brilliant I&M colleagues to contribute to this column, with the aim to open a fruitful and interesting discussion, to which also the readers can contribute. So, let us begin!



Of course, I am no exception to what I wrote above: I am young, and my experience is quite limited. So, forgive me if I start from this limited experience. If you ever had a chance to see my works, you know that I’ve worked on the expression of uncertainty in measurement.

I’ve been intrigued by this field, because, in my opinion, it is the past, the present and the future of I&M. There can’t be measurement if uncertainty can’t be expressed, as we all know quite well. I’m so persuaded by this, that I wonder why this fundamental part of metrology is not yet part of the background of every engineer in every school of engineering. Students are the future of I&M, so education in I&M is something we should investigate in one of these columns.

This time, however, I want to focus on a different problem that is probably part of the eternal fight between innovation and tradition. My research work led me to investigate a new way to express and evaluate measurement uncertainty, based on the relatively recent mathematical theory of evidence. I don’t want to talk about it now, because this is not the aim of this column. I simply want to comment on the different ways innovation is received.

Innovative proposals are the heart of scientific advancement and, to be accepted, they have to pass criticism. There

is no doubt that criticism is an important part of innovation, since it is determinant in changing a good, promising idea into a solid theory, aware of its limitations. I am personally grateful to all of those people who helped me progress in my research work, including those anonymous reviewers I can't thank personally, because they cannot disclose their identity. So let me thank them here, publicly.

Innovation generates also a different, less useful kind of criticism. That of "why to desire to make things more complicated, if we already have an approach that works in most situations?" That of "we have a standard, and we cannot change it so as not to create problems for those who invested time and money to apply it." Of course, we must accept every kind of criticism. In the end, if we are criticized, it's probably because our proposal has some weak points or, simply, because we failed to explain our points in a clear way.

Nevertheless, let me express a wish about the future. I&M is an experimental field by its nature. We should be open to experiment. When we face something new, we should try to understand it. We should try to put it in practice, and find if and how it works. Finally, we should understand its limitations and maybe try to overcome them.

I've always thought that I&M is one of our ways toward knowledge. Probably the one that, more than others, forces us to face our human limitations, since uncertainty is there to remind us that we're not perfect, and the true value will always be a mirage. I sincerely hope the future will bring us open and fruitful discussions on better, more efficient and accurate tools to advance our knowledge. One way to attain this result is to help each other with fruitful, proactive criticism.

Well, the discussion is open. Who wants to contribute? I'm looking forward to receiving your comments.