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Title: Unanswered Questions

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Unanswered Questions

2020 ASME Verification & Validation Symposium



Co-Organizers: Daniel M. Israel

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Motivation & Goals

- VVUQ is still a young field, and there is a large gap between what has been formally established and what practitioners are called upon to do.
- In 2018, we hosted the first “Unanswered Questions,” panel. The goal was to identify the important “unanswered questions,” discover “unasked questions,” and promote research of these issues.
- 2018 Panelists:
 - Paul Deacon, Siemens
 - Aaron Koskelo, Los Alamos National Laboratory
 - Sankaran Mahadevan, Vanderbilt University
 - Chris Roy, Virginia Tech
 - Dan Segelman, Michigan State University

2018 Conclusions

Some general themes came out of the 2018 discussion.

- The danger of “unknown unknowns” is inherent in all VVUQ.
- Handling model form uncertainty is a major unsolved (unsolvable?) problem.
- There is a real risk of “looking under the lamp post” when our data is limited.
- Do we use data for validation or calibration?
- Many of our tools and techniques rest on expert judgement.
- Disagreement over the correct metrics is an indication that it is not always clear what question we are asking.
- How do we roll-up individual components of VVUQ analysis into an answer that is useful for decision makers.

Questions

- This year we have asked our distinguished panelists to address the following three questions:
 1. What is the most useful, accurate, and justifiable way to convey VVUQ information to people who need to make decisions based on simulations?
 2. How do we translate metrics we can compute rigorously into metrics to be used for decision making?
 3. Assuming, as seems to be the case, that there will always be a problem of “unknown unknowns” in VVUQ, how do we account for those in reporting VVUQ results? Is there a way to do so that recognizes the subjective nature of such assessments, but is still responsible engineering practice? Is there a scientifically or mathematically valid framework for this?
- After the panel presentation, we will invite questions and comments from the audience, both on these questions or raising other important “unanswered questions” for the VVUQ community.

Logistics

- Panelists Presentation (first hour)
 - Jeff Bodner, Medtronic
 - George Hazelrigg, NSF (retired)
 - Josh Kaizer, NRC
 - Bill Oberkamp, WLO Consulting
- Discussion (second hour)
 - If you have a **question** for our panelists, please enter it in the Q&A.
 - If you have a **comment**, please put the topic in the chat.
 - E.g. “I’d like to say something about Bayesian inference.”
 - Please limit comments to one minute.
 - Of course, you can put your entire comment in the chat instead of speaking.
 - If you are having trouble with posting, you can also email to dmi1@lanl.gov.