**Releasing insights from data: quarrying vs. sculpting**

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When Michelangelo surveyed a block of marble he saw a figure trapped inside; his goal was to release the figure that in his mind was already there. Research involves not only “quarrying” (obtaining) blocks of experimental, computational or theoretical data but more importantly releasing the insights trapped within. For example, every student of physics learns about the H atom spectrum and every student of combustion learns about the 3 explosion limits of the H2-O2 system - but why these blocks of data? Because, trapped within the spectrum and the wiggly curve are critical, unequivocal insights - that energy levels of matter are quantized and that H2-O2 combustion proceeds through two entirely different sets of intermediates depending on temperature and pressure.

In those two famous examples the insights and their significance are “obvious” given the benefit of years of hindsight - what important insights are trapped inside freshly-quarried data? The focus of this presentation is on examples of and methods for sculpting data into works of insight. Starting with the aforementioned case studies the audience’s sculpting skill will be challenged with case studies from both the presenter’s own work (some not yet published) and elsewhere within combustion research community, with an emphasis on examples where the insights were both difficult to sculpt and led to counterintuitive insights.

**Biography**

Paul Ronney is a Professor and Chair of the Department of Aerospace and Mechanical Engineering at USC. Prof. Ronney received a B.S. in Mechanical Engineering from Berkeley, an MS in Aeronautics from Caltech, and a Sc.D. in Aeronautics and Astronautics from MIT. He held postdoctoral appointments at the NASA Lewis Research Center and the U. S. Naval Research Laboratory and a position as Assistant Professor at Princeton University before assuming his current position at USC. He was also a Payload Specialist Astronaut (Alternate) for Space Shuttle Missions STS-83 and STS-94 in 1997. Professor Ronney research areas include micro-scale combustion, turbulent combustion, internal combustion engines, microgravity combustion and fire spread. He has had experiments flown on three Space Shuttle missions. In recognition of his achievements he is a Fellow of the American Society of Mechanical Engineers and the Combustion Institute, an Associate Fellow of the American Institute of Aeronautics and Astronautics and a recipient of the National Science Foundation Presidential Young Investigator Award and the Combustion Institute Distinguished Paper Award.

A person wearing a suit and tie smiling at the camera

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