

Citation Speech for Tomaso Esposti Ongaro by Augusto Neri and Barry Voight; read by Augusto Neri.

Good evening again, ladies and gentlemen. For a mentor there can be no higher pleasure than to introduce a former student and current colleague for such a high honour—unless -- there are two of them! I wish to warmly thank again Barry Voight for giving me today such a unique opportunity. And so now we proudly introduce Tomaso Esposti Ongaro for the Wager Medal.

Tomaso has merited this award for several reasons:

1) He is a world-leader in computational fluid-dynamics volcanology modeling, and the main developer of multi-phase thermo-fluid dynamic codes that simulated -- for the first time -- the hugely complicated dynamics of eruption column ascent and collapse, and volcanic blasts, in *transient and fully 3D* conditions.

2) Using the codes written mainly by himself he has modeled enormously complicated pyroclastic density currents of various types and conducted meticulous validations with detailed field data and observations. These studies are unique and led to a much better understanding of the dynamics of these flows.

3) He has applied his models and original visualization techniques to volcanic crises, to the assessment of volcanic hazard, to aid government and civil defense decisions on risk with huge societal impact.

Tomaso is a physicist by initial training, and this influences his working methods. His interests are quite strongly focused in a few areas that are then examined in magnificent detail -- on multiphase flow models, compressible fluid-dynamics, volcanic jet and shock-wave generation, eruption columns and PDCs. Some experts in the numerical modeling have considered him *the* top researcher worldwide in the development of computational models of explosive eruptions. His work has certainly had a major impact on volcanology.

It was not so long ago that numerical fluid-dynamic modeling of explosive phenomena had almost exclusively involved the assumption of steady-state 1D homogeneous flow and had neglected crucial 3D features of the system, such as complex volcano topography and flow

instabilities, and atmospheric conditions. Tomaso's new code enables 4D multi-particle dynamics – that is, 3D spatial coordinates plus time -- of volcanic eruptions to be explored.

One example of his extraordinary research is his study of the 1980 blast explosion at Mount St Helens, that finally clarified the physics of that blast and made it possible to develop much-improved models for blast crisis mitigation worldwide.

Another example is his research of PDCs on Montserrat, where simulation results could be matched against observed building damage to yield the dynamic pressures required to generate specific grades of structural destruction. This information is critical for volcanic crisis mitigation, and indeed was used in this way by Tomaso for the 2007 crisis on Montserrat. Tomaso's contribution then had significant impact on advisory recommendations, on influencing the public via brilliant visualization graphics and simulation videos, and on implications of zoning decisions.

Similarly, Tomaso has applied his models to study probable eruptive scenarios at Vesuvius and Campi Flegrei for much-needed revisions in hazards planning and zoning, with his models being the cornerstone for innovative new quantitative approaches to treating building and human vulnerability. Similar work is well underway at other volcanoes worldwide.

As a top world-class scientist in fluid dynamics of explosive eruptions, Tomaso may have no peer in development of physical models for multiphase flow and shock dynamics. His research achievements are transformative, and he has extended his research to vital work aimed at mitigating important hazards and risk.

Thus Tomaso admirably fulfills the criterion of someone who has made genuinely profound high-impact contributions to volcanology at an early stage in his career. Of course we know him also as a fine gentleman and wonderful colleague, and are most proud to introduce him as the worthy recipient of the 2015 Wager Medal.

Congratulations Tomaso!

Augusto Neri and Barry Voight