Centre for Medical History
(CMH)

The Centre for the Study of Life Sciences

UNIVERSITY OF EXETER

# MEASUREMENT
## IN EARLY MODERN SCIENCE AND MEDICINE

### PHILOSOPHY, TECHNOLOGY AND EXPERIMENTATION IN SANTORIO SANTORIO (1561-1636) & GALILEO GALILEI (1564-1642)

**25 January 2016**

**3.00 - 5.00 PM**

**Byrne House**

**SPEAKERS**

**MATTEO VALLERIANI**
**Max Plank Institute**

**FABRIZIO BIGOTTI**
**Centre for Medical History**
**University of Exeter**

**REPLY**

**DAN NICHOLSON**
**Egenis**

**MATTEO VALLERIANI** *Max Plank Institute, Berlin*

### The Changing Epistemic Function of Measurement in the Early Modern Period. Tartaglia's Quadrant and Galileo's Thermoscope

Processes of emergence of new science during the early modern period were closely linked to measurement practices and taxonomic procedures. Such practices and procedures, however, did not necessarily arise on the basis of the immediate scope to create new scientific knowledge. Instead, they were mostly anchored to needs of practical nature and to the spread of technological innovations. It was only in a second moment and in concomitance with specific contextual conditions that such practices and procedures became the core around which new scientific knowledge was formulated. Typical of such phases of transition is the change of the status of instruments that, in fact, had already been in use for a long time: from being regarded as useful instruments they evolved to emblematic epistemic symbols of new theoretical insights. From this perspective, the case of the emergence of Nicolò Tartaglia's *Nova scientia* and Galileo's attempts to reform the early modern Aristotelian theory of heat will be analyzed while focusing on the changes of the epistemic role of the quadrant for artillerists and of the pneumatic bulb, sensitive to temperature, the ancestor of the thermometer

**FABRIZIO BIGOTTI** *Centre for Medical History, University of Exeter*

### Santorio on the Use of Quantity in Logical Demonstration and Diagnosis

Santorio devoted great endeavours in order to put the diagnosis on the ground of certainty. As opposite to the procedure used by empirical doctors, certainty is always the result of an analytical approach (*analyticae rationes*). In keeping with the Aristotelian analysis and the Galenic theory of indication, Santorio perfected an approach to natural philosophy already elaborated by his teacher in Padua, the well-known logician Jacopo Zabarella (1533-1589). Painstakingly discussing possibilities and limits of quantification, he elaborated a new methodology and a new theory of matter that allowed him to avoid the tight spot of the Aristotelian distinction between substance and properties, and which he ultimately featured in four parameters, «where», «how», «how much» and «when» (*ubi, quomodo, quantus, quando*). By pointing out and analyzing some examples of Santorio's diagnostic reasoning, in this paper I will focus on the epistemological framework of his methodology. I shall also stress analogies and differences with Galileo, notably in the light of the distinction between "measurement" and "quantification". By also relying on sources previously unknown, I will eventually illustrate the functioning of the *pulsilogium* to highlight what were the scientific outcomes of Santorio's method and how they influenced generations of physicians, possibly representing a source of inspiration for the same Galileo.