

Data Infrastructural Design for Informing Critical Evaluation

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Exponential data growth and non-negligible error rates in the scientific literature [1] make critical evaluations impracticable for most scientists. The Thermodynamics Research Center (TRC) at the National Institute of Standards and Technology (NIST) addresses this with dynamic data evaluation, whereby a reliable and comprehensive data archive together with an algorithmically-encoded expert analysis generates up-to-date property recommendations. To develop the necessary infrastructure, TRC staff have created technological solutions for data collection, curation and communication to quickly meet the challenges encountered under real-world conditions. These include user experience-driven data entry tools, and international data standards and ad hoc derivatives of them. These tools will be discussed as well the importance of being both proactive and reactive in the information technology development process.

[1] Chirico, R.D. et al., "Improvement of Quality in Publication of Experimental Thermophysical Property Data: Challenges, Assessment Tools, Global Implementation, and Online Support" J. Chem. Eng. Data 2013, 58, 2699–2716.