

R. Hartenstein, [TUK](#), Sept. 2018: **The Programming Crisis**

Climate change could destroy our kids' lives if we don't act now\*. Over 100,000 people have marched in climate change protests around France on Saturday at September 8 in 2018\*. To cope with the von Neumann syndrome<sup>1,2</sup> we must improve the energy efficiency of data stations by orders of magnitude.

Tsugio Makimoto published his crisis wave model in the mid' 90ies. I added a third wave (fig. 1). The scope variety of FPGA-related papers in thousands of conferences (click here) illustrates, that we are now in the 3rd design crisis (fig. 1).

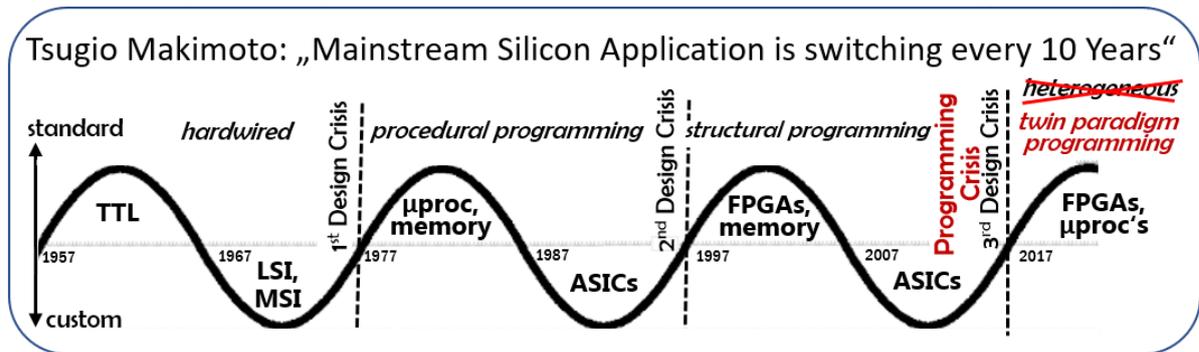


Fig. 1: Semiconductor Revolutions: Makimoto's Wave (extended).

The 3<sup>rd</sup> Design Crisis is a Programming Crisis. Makimoto's trend illustration model illustrates, that practicable efficient methodologies to reimplement many thousands of very large systems (see fig. 2) like internet data stations<sup>3</sup> for massively better energy efficiency by FPGA use are not available. The dominance of the term "heterogeneous" illustrates **the brick wall in the brains**. To master this crisis for programmers both, education curricula and programming practice, must urgently be changed for a successful **twin paradigm** approach, where both paradigms are tightly interfaced into each other<sup>4</sup>. That's why twin paradigm is a challenge which we must master urgently.



Fig. 2; A typical size: of one of many thousands of data stations worldwide;

**Conferences should urgently feature "twin paradigm processing"** and related areas as the most important items in top areas of the call for papers<sup>5</sup>.

**Literature** (also click [here](#) !!)

- [1] R. Hartenstein: The von Neumann Syndrome; SV Symposium „The Future of Computing“,2007, [Delft](#)
- [2] R. Hartenstein: Reconfigurable Computing and the von Neumann Syndrome; [ICA3PP](#) 2007, [abstr./ slides](#)
- [3] R. Hartenstein: Number and size of data centers, March 2013, TU Kaiserslautern, click [here](#)
- [4] R. Hartenstein: SE Curricula are Unqualified to Cope with the Data Avalanche, Febr. 2017, [TUK](#), click [here](#)
- [5] R. Hartenstein: Twin Paradigm Computing; September 2018, TU Kaiserslautern, click [here](#)