

## **Silicon *in vivo*.**

### **Architectural solutions to the problem of linking the world of microelectronics to that of living systems**

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It is now possible to sense many metabolites inside the entire cell with spatial resolution on the length scale of 10 nm. This result can be achieved exploiting the crossbar architecture with deterministically addressable cross-points [1], provided that the wire arrays defining the crossbar have pitch on the said length scale and each cross-point is suitably functionalized to feel the chemical state in its neighbourhood. This lecture will show that such a crossbar can be produced with existing sublithographic technologies (like the superlattice nanowire pattern transfer [2] or the multispacer patterning technology [3]) and will speculate on the use of self-aligned carbon nanotubes as sensing elements.

1. G. F. Cerofolini, and E. Romano Appl. Phys. A **91**, 181 (2008).
2. D. Wang, B. A. Sheriff, M. McAlpine, and J. R. Heath, Nano Res. **1**, 9 (2008).
3. G. F. Cerofolini, Appl. Phys. A **86**, 31 (2007).