Going from 3D Technological Opportunities to 3D Manycore Programming

**3D Technological Opportunities**
- Interconnect stacks with through silicon vias (TSV).
- Address thermal challenge with active cooling.

**3D Architecture Exploration**
- Compute optimal mappings.
- Revisit memory hierarchies.
- Thermal aware stacking.

**3D Software Programming**
- Build software by means of correct-by-construction software assembly.
- Generate binary code & network-on-chip (NoC) configuration.
- Enable runtime cooling control.
- Memory neighbourhood programming model.

**3 Phases over 30 Months**

**Phase 1: 6 months  
« 3D Requirements Gathering »**
3D brings many options at all levels. Refine individual options and ensure global consistency of the whole.

**Phase 2: 12 months  
« Towards 3D »**
Bootstrap 3D advances into the architecture prototypes and software toolchains.

**Phase 3: 12 months  
« With 3D »**
Bring 3D options together through continuous integration.

**World Class Research & Assets**
- Application Mapping DOL: ETH Zürich
- Correctness by Construction BIP: VERIMAG
- 3D Cooling & 3D Stacks Interconnects EPFL Lausanne, LETI
- Architecture Exploration ETHZ, EPFL, UNIBO
- Manycore Industrial Platform STMicroelectronics
- Application Benchmarks STMicroelectronics

**PRO3D Milestones**
- Early 3D-DOL
- Early 3D Compilation Chain
- Early 3D Low Level SW
- Early 3D Architecture Space
- Early 3D Architecture VPI

**PRO3D Outcome**
- 3D Architecture Exploration Environment
- New 3D Architecture Concepts in Cooling & Interconnect for Manycore Platforms
- Software Dev. Environment for Manycore Platforms with 3D Cooling & Interconnect