

UNIPA: Inter-Component Optimization

- **Investigator:** Armin Größlinger
- **Idea:**
 - Components are individually optimized black boxes.
 - The composition of components must be reoptimized.
 - Algebraic properties of the components form the basis for the retuning.
 - Properties are exploited at composition time and/or at run time.
- **Challenges:**
 - Make the framework general and flexible.
 - Identify profitable transformations.
- **Funding and Connections:**
 - DAAD/ARC: Dr. Paul H. Kelly (Imperial College)
 - IFIP WG 2.11 (Program Generation)
 - CoreGrid: Prof. Marco Danelutto (UNIFI)
 - DFG: research proposal in preparation
- **Tasks:** 3.1, 3.2

UNIPA: Skeletal Metaprogramming

- **Investigator:** Dr. Christoph Herrmann
- **Idea:**
 - Components are higher-order program modules.
 - Metaprogramming raises the level of abstraction in programming and customizes the compilation process.
 - Components are developed at different levels of abstraction.
 - Execution time and resource usage are design parameters.
- **Funding and Connections:**
 - DAAD/Procope: Dr. Albert Cohen (INRIA Futurs)
 - DAAD/ARC: Dr. Paul H. Kelly (Imperial College)
 - IFIP WG 2.11 (Program Generation): Prof. Walid Taha (Rice University)
 - DFG: research proposal in preparation
- **Challenges:**
 - Efficient target code
 - Fast component assembly by algebraic composition at the top level
 - Automatic verification of consistency conditions between the levels
- **Tasks:** 3.1, 3.2

UNIPA: Loop Parallelization

- **Investigator:** Dr. Martin Griebel
- **Idea:**
 - Use the polyhedron model to parallelize nested loops automatically.
 - Focus on tiling techniques to calibrate the parallelism for a heterogeneous, dynamically changing platform.
- **Challenges:**
 - Extend the mathematical basis to cope with heterogeneity.
 - Find appropriate protocols to cope with dynamicity.
 - Obtain efficient execution in the face of dynamicity.
- **Funding and Connections:**
 - DAAD/Procope: Dr. Albert Cohen (INRIA Futurs)
 - Prof. Paul Feautrier (ENS Lyon)
 - DFG: research proposal submitted
- **Tasks:** 3.3