DALI

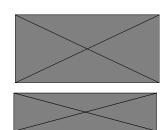
Digits, Architecture Computer Software

Montpellier Laboratory of Informatics, Robotics and Microelectronics

Informatics Department

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COMPUTER ARITHMETIC, ARCHITECTURE, PROCESSOR MICO-ARCHITECTURE, SIMULATION OF CALCULATION UNITS, DIGITAL VALIDATION, ERROR ANALYSIS, SEMANTIC TRANSFORMATION OF PROGRAMS, STATIC ANALYSIS, CRYPTOGRAPHY, HIGH-PERFORMANCE COMPUTING, HYBRID SYSTEMS

Presentation

The DALI team is developing a unified research area in order to improve the digital quality and high performance of calculations. DALI enables experts in architecture, micro-architecture, simulation, and computer compilation and arithmetic to work together in the same team, which is considered as rare in France.

Research activities carried out over the 2005-2009 period involve hardware (generalist processors, emerging architectures), software (arithmetic and precision), simulation and automatic certification tools, and applications (digital algorithmics, cryptography, critical embedded systems, formal calculation, control theory).

Team Members (May, 2009)

•	Defour David	01/09/2004	MCF UPVD
t.	Goossens Bernard	01/09/2003	PR UPVD - HDR
Permanent	Langlois Philippe (dir.)	01/09/2003	PR UPVD - HDR
• na	Negre Christophe	01/09/2006	MCF UPVD
•	Martel Matthieu	01/09/2007	MCF UPVD - HDR
<u> </u>	Parello David	01/09/2005	MCF UPVD
νς •	Bouache Mourad	01/09/2006	01/09/2010
ate •	Collange Sylvain	01/09/2007	01/09/2010
<u></u>	El Moussaoui Ali	01/09/2007	01/09/2011
<u> </u>	Ke Chen	01/09/2007	01/09/2011
PhD candidates	Ioualalen Arnault	01/09/2009	31/08/2012
뎣			
<u> </u>	Giorgi Pascal	01/01/2006	31/08/2007
<u>_</u> •	Petit Eric	01/01/2009	31/08/2010 (ATER)
Other	Senouci Benaoumeur	01/09/2007	31/08/2009
Ö.	Vecchié Eric	01/01/2005	31/08/2005

Theses supervised

•	Graillat Stef	Defended Nov. 2005	(MCF UPMC, LIP6)
•	Louvet Nicolas	Defended Nov. 2007	(MCF, U. Lyon 1, LIP)



Publications (from 01/01/2005 to 31/08/2009)

	ACL	ACLN	ASCL	INV	ACTI	ACTN	СОМ	AFF	OS	OV	DO	AP	BV	Prix	Orga
2005-2009	17			3	46	5	11	7				16			3

Highlights

- Consolidation of team created as young researcher ACI 2003-2006 via heavy external recruitment over 2005-2007
- Thematically-coherent unit with complementary expertise
- · Recognition and integration of PhDs trained within the team

Contracts, Transfers and Development

- Research contract with Airbus and CEA, MASSANE project: validation tool for control systems on digital flights
- Research contract with FNRAE, SARDANES project: certified transformation of Scade codes for digital precision
- Research contract 2006-2008 between DALI, Polytech'Paris and a French energy group, new architectures for scientific computing
- Technology intelligence collaboration with N'Vidia and ATI since 2007 on general computing on graphics cards (equipment donation)
- Young researcher ACI 2003-2006: Digital software and arithmetic quality on computers
- ANR white program 2007, EVA-Flo (Automatic Evaluation and Validation for FLOttant)
- ANR white program 2007, BioWic (Workflow for intensive bioinformatics processing)
- Member of UNISIM Consortium with CEA, INRIA, Princeton University, Brigham University, Univ. Polytech. Catalunya, Barcelona Computer Center, Ghent University, ARM, ST: software simulation platform (participating institution)

International Cooperation

- University of Boumerdès, Algeria
- T.U. University, Hamburg-Harburg, Germany
- Universitat de Girona, Spain
- University of Manchester, United Kingdom
- University of Szeged, Hungary
- University of Waterloo, Canada
- Intel Nizhnyi-Novgorod, Russia
- University of Novosibirsk, Russia
- University Waseda, Tokyo, Japan
- University of California, Irvine, USA
- Rice University, Houston, USA

Software Platforms

- OOSim: modular cycle-level simulator of generic superscalar processor based on the PowerPC instruction set. UNISIM, licence BSD
- Barra: NVIDIA G80 CUDA graphics processor simulator, UNISIM, BSD license
- Boost: Interval on GPU: guaranteed interval arithmetic in CUDA and Cg. Boost Software Licence