

Preface

Euro-Par is an international conference dedicated to the promotion and advancement of all aspects of parallel computing. The major themes can be divided into the broad categories of hardware, software, algorithms and applications for parallel computing. The objective of Euro-Par is to provide a forum within which to promote the development of parallel computing both as an industrial technique and an academic discipline, extending the frontier of both the state of the art and the state of the practice. This is particularly important at a time when parallel computing is undergoing strong and sustained development and experiencing real industrial take-up. The main audience for and participants in Euro-Par are seen as researchers in academic departments, government laboratories and industrial organisations. Euro-Par's objective is to become the primary choice of such professionals for the presentation of new results in their specific areas. Euro-Par is also interested in applications which demonstrate the effectiveness of the main Euro-Par themes.

There is now a permanent Web site for the series <http://brahms.fmi.uni-passau.de/c1/europar> where the history of the conference is described. Euro-Par is now sponsored by the Association of Computer Machinery and the International Federation of Information Processing.

Euro-Par'99

The format of Euro-Par'99 follows that of the past four conferences and consists of a number of topics each individually monitored by a committee of four. There were originally 23 topics for this year's conference. The call for papers attracted 343 submissions of which 188 were accepted. Of the papers accepted, 4 were judged as distinguished, 111 as regular and 73 as short papers. Distinguished papers are allowed 12 pages in the proceedings and 30 minutes for presentation, regular papers are allowed 8 pages and 30 minutes for presentation, short papers are allowed 4 pages and 15 minutes for presentation. Distinguished papers are indicated in the table of contents with a superscribed asterisk after the title. Four extra pages could be purchased for distinguished papers, two for regular papers and one for short papers. There were on average 3.5 reviews per paper. Submissions were received from 44 countries, 34 of which are represented at the conference. The principal contributors by country are France with 39 papers, the U.S.A. with 22, Germany with 19, and the U.K., Italy and Spain with 13 papers each. This year's conference, Euro-Par'99, features new topics such as fault avoidance and fault removal in real-time systems, instruction-level parallelism and uniprocessor architecture, and global environment modelling.

The Web site for the conference is <http://www.enseeiht.fr/europar99/>.

Acknowledgments

Knowing the quality of the past Euro-Par conferences makes the task of organising one daunting indeed and we have many people to thank. Ron Perrott, Christian Lengauer, Luc Bougé, Jeff Reeve and David Pritchard have given us the benefit of their experience and helped us generously throughout the past 18 months. The topic structure of the conference means that we must depend on the goodwill and enthusiasm of all the 90 programme committee members listed below. Their professionalism makes this the most academically rigorous conference in the field worldwide. The programme committee meeting at Toulouse in April was well attended and, thanks to sound preparation by everyone and Ron Perrott's guidance, resulted in a coherent, well-structured conference. The smooth running of the organisation of the conference can be attributed to a few individuals. Firstly the software for the submission and refereeing of papers that we inherited from Lyon via Passau was significantly enhanced by Daniel Ruiz. This attracted many compliments from those who benefited. Valérie Frayssé and Luc Giraud spent copious hours checking, printing and correcting papers. Finally, Brigitte Yzel, secretary to the conference and the CERFACS Parallel Algorithms Project, has been invaluable in monitoring the conference organisation and seeing to the myriad of tasks that invariably arise.

June 1999

Patrick Amestoy
Philippe Berger
Michel Daydé
Iain Duff
Valérie Frayssé
Luc Giraud
Daniel Ruiz

Euro-Par Steering Committee

Chair	Ron Perrott	Queen's University Belfast, UK
Vice Chair	Christian Lengauer	University of Passau, Germany
Committee		
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Luc Bougé	ENS Lyon, France	
Helmar Burkhardt	University of Basel, Switzerland	
Pierrick Fillon-Ashida	European Commission, Belgium	
Paul Feautrier	University of Versailles, France	
Ian Foster	Argonne National Laboratory, USA	
Jeff Reeve	University of Southampton, UK	
Henk Sips	Technical University Delft, The Netherlands	
Paul Spirakis	CTI, Greece	
Marian Vajtersic	Slovak Academy, Slovakia	
Marco Vanneschi	University of Pisa, Italy	
Jens Volkert	Johannes Kepler University Linz, Austria	
Emilio Zapata	University of Malaga, Spain	

Euro-Par'99 Local Organisation

The conference has been jointly organised by CERFACS (Centre Européen de Recherche et de Formation Avancée en Calcul Scientifique) and ENSEEIHT-IRIT (Ecole Nationale Supérieure d'Electronique, d'Electrotechnique, d'Informatique et d'Hydraulique de Toulouse - Institut de Recherche en Informatique de Toulouse).

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Valérie Frayssé	CERFACS
Luc Giraud	CERFACS
Informatics Chair	
Daniel Ruiz	ENSEEIHT-IRIT
Secretary	
Brigitte Yzel	CERFACS

Euro-Par'99 Programme Committee

Topic 01: Support Tools and Environments

Global Chair

Ian Foster Argonne Nat. Lab., USA

Local Chair

Frédéric Desprez LIP-INRIA, Lyon, France

Vice Chairs

Jean-Marie Garcia LAAS, Toulouse, France

Thomas Ludwig TU Munich, Germany

Topic 02: Performance Evaluation and Prediction

Global Chair

Aad van der Steen Utrecht Univ., The Netherlands

Local Chair

Jean-Marc Vincent IMAG, Grenoble, France

Vice Chairs

Erich Strohmaier Univ. of Tennessee at Knoxville, USA

Jerzy Wasniewski Uni-C, Denmark

Topic 03: Scheduling and Load Balancing

Global Chair

Jean-Marc Geib LIFL, Lille, France

Local Chair

Jean Roman LaBRI, Bordeaux, France

Vice Chairs

Bruce Hendrickson SNL, Albuquerque, USA

Pierre Manneback PIP, Mons, Belgium

Topic 04: Compilers for High Performance Systems

Global Chair

Barbara Chapman University of Southampton, UK

Local Chair

François Bodin INRIA-IRISA, Rennes, France

Vice Chairs

Louis Féraud IRIT, Toulouse, France

Chris Lengauer FMI, University of Passau, Germany

Topic 05: Parallel and Distributed Databases

Global Chair

Burkhard Freitag University of Passau, Germany

Local Chair

Kader Hameurlain IRIT, Toulouse, France

Vice Chairs

Lászlo Böszörmenyi University of Klagenfurt, Austria

Waqar Hasan DB WIZARD, CA, USA

Topics 06 + 20: Fault Avoidance and Fault Removal in Real-Time Systems

Global Chairs

Ravi Iyer Univ. of Illinois, USA

Tomasz Szymuc St. Staszic TU, Krakow, Poland

Local Chairs

Gilles Motet INSA, Toulouse, France

David Powell LAAS-CNRS, Toulouse, France

Vice Chairs

Wolfgang Halang FernUniversität, Hagen, Germany

Andras Pataricza TU Budapest, Hungary

Joao Gabriel Silva University of Coimbra, Portugal

Janusz Zalewski Univ. of Central Florida, Orlando, USA

Topic 07: Theory and Models for Parallel Computation

Global Chair

Michel Cosnard LORIA-INRIA, Nancy, France

Local Chair

Afonso Ferreira CNRS-I3S-INRIA, Sophia Antipolis, France

Vice Chairs

Sajal Das University of North Texas, USA

Frank Dehne Carleton University, Canada

Topic 08: High-Performance Computing and Applications

Global Chair

Horst Simon NERSC, L. Berkeley Lab., CA, USA

Local Chair

Michael Rudgyard Oxford Univ. and CERFACS, England

Vice Chairs

Wolfgang Gentzsch GENIAS Software, Germany

Jesus Labarta CEPBA, Spain

Topic 09: Parallel Computer Architecture

Global Chair

Chris Jesshope

Massey University, New Zealand

Local Chair

Daniel Litaize

Université Paul Sabatier, France

Vice Chairs

Karl Dieter Reinartz

University of Erlangen, Germany

Per Stenstrom

Chalmers University, Sweden

Topic 10: Distributed Systems and Algorithms

Global Chair

André Schiper

EPFL, Lausanne, Switzerland

Local Chair

Gérard Padiou

ENSEEIHT-IRIT, Toulouse, France

Vice Chairs

Roberto Baldoni

University of Rome, Italy

Jerzy Brzezinski

Fac. of Electrical Eng., Poznan, Poland

Friedemann Mattern

TU-Darmstadt, Germany

Luis Rodrigues

Faculty of Sciences, Univ. of Lisbon, Portugal

Topic 11: Parallel Programming: Models, Methods and Languages

Global Chair

Luc Bougé

ENSL, Lyon, France

Local Chair

Mamoun Filali

IRIT, Toulouse, France

Vice Chairs

Bill McColl

Oxford Univ. Computing Lab., UK

Henk J. Sips

TU Delft, The Netherlands

Topic 12: Architectures and Algorithms for Vision and other Senses

Global Chair

Virginio Cantoni

University of Pavia, Italy

Local Chair

Alain Ayache

ENSEEIHT-IRIT, Toulouse, France

Vice Chairs

Concettina Guerra

Purdue Univ., USA, and Padoa Univ., Italy

Pieter Jonke

TU Delft, The Netherlands

Topics 13+19: Numerical Algorithms for Linear and Nonlinear Algebra

Global Chairs

Jack Dongarra

Bernard Philippe

Local Chairs

Patrick Amestoy

Valérie Frayssé

Vice Chairs

Françoise Chaitin-Chatelin

Donato Trigiante

Marian Vajtersic

Henk van der Vorst

Univ. of Tennessee and ORNL, USA

INRIA-IRISA, Rennes, France

ENSEEIHT-IRIT, Toulouse, France

CERFACS, Toulouse, France

Univ. Toulouse I and CERFACS, France

University of Florence, Italy

Slovak Academy, Bratislava

Utrecht University, The Netherlands

Topic 14: Emerging Topics in Advanced Computing in Europe

Global Chair

Renato Campo

European Commission, DG XIII, Belgium

Local Chair

Luc Giraud

CERFACS, Toulouse, France

Vice Chair

Pierrick Fillon-Ashida

European Commission, DG XIII, Belgium

Rizos Sakellariou

CRPC, Rice University, Houston, USA

Topic 15: Routing and Communication in Interconnection Networks

Global Chair

Ernst W. Mayr

TU Munich, Germany

Local Chair

Pierre Fraigniaud

LRI, Orsay, France

Vice Chairs

Bruce Maggs

Carnegie Mellon Univ., Pittsburg, USA

Jop Sibeyn

MPI, Saarbrücken, Germany

Topic 16: Instruction-Level Parallelism and Uniprocessor Architecture

Global Chair

Mateo Valero

CEPBA, Polytech. Univ. of Catalunya, Spain

Local Chair

Pascal Sainrat

IRIT, Toulouse, France

Vice Chairs

D. K. Arvind

Edinburgh Univ., Computer Science Dept., UK

Stamatis Vassiliadis

TU Delft, The Netherlands

Topic 17: Concurrent and Distributed Programming with Objects

Global Chair

Akinori Yonezawa University of Tokyo, Japan

Local Chair

Patrick Sallé ENSEEIHT-IRIT, Toulouse, France

Vice Chairs

Joe Armstrong Ericsson, Sweden

Vasco T. Vasconcelos University of Lisbon, Portugal

Marc Pantel ENSEEIHT-IRIT, Toulouse, France

Topic 18: Global Environment Modelling

Global Chair

David Burridge ECMWF, Reading, UK

Local Chair

Michel Déqué Météo-France, Toulouse, France

Vice Chairs

Daniel Cariolle Météo-France, Toulouse, France

Jean-Pascal van Ypersele Louvain la Neuve Inst. of Astrophysics, Belgium

Topic 22: High-Performance Data Mining and Knowledge Discovery

Global Chair

David Skillicorn Queens University, Kingston, Canada

Local Chair

Domenico Talia ISI-CNR, Rende, Italy

Vice Chairs

Vipin Kumar Univ. of Minnesota, USA

Hannu Toivonen RNI, University of Helsinki, Finland

Topic 23: Symbolic Computation

Global Chair

John Fitch University of Bath, UK

Local Chair

Mike Dewar NAG Ltd, Oxford, UK

Vice Chairs

Erich Kaltofen North Carolina State Univ., Raleigh, USA

Anthony D. Kennedy Edinburgh University, Scotland

Euro-Par'99 Referees

(excluding members of the programme and organisation committees)

Adelantado, Martin	Boukerche, Azzedine	Cole, Murray
Akl, Selim	Boulet, Pierre	Conter, Jean
Albanesi, Maria Grazia	Bourzoufi, Hafid	Corbal, Jesus
Alvarez-Hamelin, I.	Braconnier, Thierry	Correia, Miguel
Amir, Yair	Bradford, Russell	Costa, Antonio
Amodio, Pierluigi	Brandes, Thomas	Costa, Ernesto
Ancourt, Corinne	Braunl, Thomas	Cotofana, Sorin
Arbab, Farhad	Broggi, Alberto	Coudert, David
Arbenz, Peter	Broom, Bradley	Coulette, Bernard
Arnold, Marnix	Browne, Shirley	Counilh, Marie-Christine
Aronson, Leon	Brugnano, Luigi	Courtier, Philippe
Asenjo, Rafael	Brun, Olivier	Cristal, Adrian
Avresky, D.	Bungartz, Hans-Joachim	Crouzet, Yves
Aydt, Ruth	Burkhart, Helmar	Crégut, Xavier
Ayguade, Eduard	Buvry, Max	Cubero-Castan, Michel
Aykanat, Cevdet	Caires, Luis	Cucchiara, Rita
Baden, Scott	Calamoneri, Tiziana	Cung, Van-Dat
Bagchi, Saurabh	Cameron, Stephen	Dackland, Krister
Bai, Z.	Caniaux, Guy	Daoudi, El Mostafa
Baker, Mark	Cappello, Franck	Dechering, Paul
Bal, Henri	Carissimi, Alexandre	Defago, Xavier
Baquero, Carlos	Caromel, Denis	Dekeyser, Jean-Luc
Barreiro, Nuno	Carter, Larry	Delmas, Olivier
Bartoli, Alberto	Cassé, Hugues	Delord, Xavier
Baudon, Olivier	Castro, Miguel	Denissen, Will
Becchetti, Luca	Catthoor, Francky	Denneulin, Yves
Béchennec, Jean-Luc	Cavalheiro, Gerson	Di, Vito
Becka, Martin	Chartier, Philippe	Di Martino, Beniamino
Beemster, Marcel	Charvillat, Vincent	Di Stefano, Luigi
Bellegarde, Françoise	Chassin de	Doblas, Francisco Javier
Bellosa, Frank	Kergommeaux, Jacques	Dominique, Orban
Benzi, Michele	Chauhan, Arun	Doreille, Mathias
Beraldì, Roberto	Chaumette, Serge	Dörfel, Mathias
Bernon, Carole	Cheng, Ben-Chung	Douville, Hervé
Berthomé, Pascal	Chesneaux, Jean-Marie	Drira, Khalil
Bétourné, Claude	Chich, Thierry	Duato, José
Biancardi, Alberto	Chmielewski, Rafal	Duchien, Laurence
Birkett, Nick	Cilio, Andréa	Durand, Bruno
Bodeveix, Jean-Paul	Cinque, Luigi	Eigenmann, Rudolf
Boichat, Romain	Ciuffoletti, Augusto	Eijkhout, Victor
Bolychevsky, Alex	Clocksin, William	Eisenbeis, Christine
Bos, André	Coelho, Fabien	Eldershaw, Craig

XIV Referees

Ellmenreich, Nils	Gonzalez-Escribano, A.	Kakugawa, Hirotugu
Endo, Toshio	Goossens, Bernard	Kalbarczyk, Zbigniew
Erhel, Jocelyne	Grammatikakis, Miltos	Kale, Laxmikant
Etiemble, Daniel	Gratton, Serge	Katayama, Takuya
Evans., D.J.	Greiner, Alain	Kaufman, Linda
Even, Shimon	Griebl, Martin	Kehr, Roger
Fabbri, Alessandro	Grislin-Le Strugeon, E.	Keleher, Peter
Faber, Peter	Gropp, William	Kelly, Paul
Farcy, Alexandre	Guedes, Paulo	Kesselman, Carl
Feautrier, Paul	Guivarch, Ronan	Killijian, Marc-Olivier
Fent, Alfred	Guo, Katherine	Kindermann, Stephan
Ferragina, Paolo	Gupta, Anshul	Kiper, Ayse
Ferreira, Maria	Gustedt, Jens	Klasing, Ralf
Fidge, Colin	Guyennet, Hervé	Knijnenburg, Peter
Fimmel, Dirk	Hains, Gaetan	Knoop, Jens
Fischer, Claude	Hains, Gaétan	Koelbel, Charles
Fischer, Markus	Halleux, Jean-Pierre	Kolda, Tamara
Fleury, Eric	Han, Eui-Hong	Kosch, Harald
Fonlupt, Cyril	Haquin, Thierry	Kossmann, Donald
Fraboul, Christian	Harald, Kosch	Koster, Jacko
Fradet, Pascal	Hart, William	Kredel, Heinz
Fragopoulou, Paraskevi	Hatcher, Phil	Kruse, Hans-Guenther
Frietman, Edward E.E.	Hegland, Markus	Kuchen, Herbert
Fünfrocken, Stefan	Helary, Jean-Michel	Kucherov, Gregory
Galilee, François	Henty, David	Kurmann, Christian
Galloopoulos, Efstratios	Herley, Kieran	Kvasnicka, Dieter
Gamba, Paolo	Herrmann, Christoph	de Laat, Cees
Gandriauf, Marcel	Higham, Nicholas J.	Ladagnous, Philippe
Gaspar, Graca	Hitz, Markus	Lahlou, Chams
Gatlin, Kang Su	Hoisie, Adolfy	Langlois, Philippe
Gauchard, David	Houzet, Dominique	Larriba-Pey, Josep L.
Gautama, Hasyim	Hruz, Tomas	Laure, Erwin
Gavaghan, David	Hurfin, Michel	Lavenier, Dominique
Gavoille, Cyril	Ierotheou, Cos	LeCun, Bertrand
Geist, Al	Izu, Cruz	Lecomber, David
Geleyn, Jean-François	Jabouille, Patrick	Lecomber, david
van Gemund, Arjan	Jeannot, Emmanuel	Lecussan, Bernard
Gengler, Marc	Jégou, Yvon	Leese, Robert
Genius, Daniela	Jin, Guohua	Legall, Françoise
Gerndt, Michael	Jonker, Pieter	Leuschel, Michael
Getov, Vladimir	Joshi, Mahesh	L'Excellent, Jean-Yves
Girau, Bernard	Jourdan, Stephan	Li, Xiaoye S.
Goldman, Alfredo	Juanole, Guy	Lindermeier, Markus
Gonzalez, Antonio	Juurlink, Ben	van Lohuizen, Marcel P.
Gonzalez, José	Kågström, Bo	Lombardi, Luca

Lombardo, Maria-Paola	Morin, Christine	Pizzuti, Clara
Lopes, Cristina	Morris, John	Plaks, Toomas
Lopes, Luis	Morvan, Franck	Planton, Serge
Lopez, David	Mostefaoui, Achour	Porto, Stella
Loucks, Wayne	Mounie, Gregory	Pozo, Roldan
Luksch, Peter	Mucci, Philip	Prakash, Ravi
Lusk, Ewing	Muller, Jean-Michel	Pritchard, David
Lutton, Evelyne	Mutka, Matt	Prylli, Loïc
Llosa, Josep	Mzoughi, Abdelaziz	Pryor, Rich
Manolopoulos, Yannis	Nash, Jonathan	Pucci, Geppino
Marchetti, Carlo	Nemeth, Zsolt	Puglisi, Chiara
Marchetti-Spaccamela, A.	Neves, Nuno	Quaglia, Francesco
Marcuello, Pedro	Nichitiu, Codrin	Quinton, Patrice
Marquet, Pascal	Nicole, Denis	Quéinnec, Philippe
Marquet, Philippe	Norman, Arthur	Rackl, Guenther
Martel, Ivàn	Novillo, Diego	Radulescu, Andrei
Marthon, Philippe	O'Boyle, Michael	Raghavan, Padma
Martin, Bruno	Ogihara, Mitsunori	Rajopadhye, Sanjay
Maslennikov, Oleg	Ogston, Elizabeth	Ramirez, Alex
Masuhara, Hidehiko	Oksa, Gabriel	Rapine, Christophe
Mauran, Philippe	Oliveira, Rui	Rastello, Fabrice
Maurice, Pierre	Ortega, Daniel	Rau-Chaplin, Andrew
Mautor, Thierry	Owezarski, Philippe	Rauber, Thomas
Mechelli, Marco	Oyama, Yoshihiro	Ravara, Antnio
Méhaut, Jean-François	Oztekin, Bilgehan U.	Raynal, Michel
Mehofer, Eduard	Paillassa, Béatrice	van Reeuwijk, C.
Mehrotra, Piyush	Pantel, Marc	Renaudin, Marc
Meister, Gerd	Paprzycki, Marcin	Rescigno, Adele
Melideo, Giovanna	Paugam-Moisy, Hélène	Revol, Nathalie
Merlin, John	Pazat, Jean-Louis	Rezgui, Abdelmounaam
Mery, Dominique	Pedone, Fernando	Richter, Harald
Meszaros, Tamas	Pellégrini, Franois	Risset, Tanguy
Meurant, Gérard	Pereira, Carlos	Roberto, Vito
Mevel, Yann	Perez, Christian	Roch, Jean-Louis
Meyer, Ulrich	Perrin, Guy-René	Rochange, Christine
Michael, W.	Perry, Nigel	Roos, Steven
Michaud, Pierre	Petitet, Antoine	Rose, Kristoffer
Miller, Bart	Petiton, Serge	Royer, Jean-François
Miller, Quentin	Petrosino, Alfredo	Rubi, Franck
Moe, Randi	Phillips, Cynthia	Rychlik, Bohuslav
Monnier, Nicolas	Pialot, Laurent	Sagnol, David
Montanvert, Annick	Piccardi, Massimo	Sajkowski, Michal
Monteil, Thierry	Pietracaprina, Andréa	Sanchez, Jesus
Moreira, Ana	Pingali, Keshav	Sanders, Peter
Morère, Pierre	Pitt-Francis, Joe	Sanjeevan, K.

XVI Referees

Santos, Eunice	Stanton, Jonathan	Thuné, Michael
Saouter, Yannick	Stathis, Pyrrhos	Tiskin, Alexandre
Savoia, Giancarlo	Stein, Benhur	Toetenel, Hans
Schaerf, Andréa	Steinbach, Michael	Torng, Eric
Schreiber, Robert S.	Stricker, Thomas M.	Tortorici, Adèle
Schreiner, Wolfgang	Strout, Michelle Mills	Trehel, Michel
Schulz, Martin	Stunkel, Craig	Trichina, Eléna
Schuster, Assaf	Subhlok, Jaspal	Trystram, Denis
Schwertner-Charao, A.	Sumii, Eijiro	Tsikas, Themos
Seznec, André	Surlaker, Kapil	Tuecke, Steve
Siegle, Markus	Swarbrick, Ian	Tůma, Miroslav
Sieh, Volkmar	Swierstra, Doaitse	Tvrđik, Pavel
Silva, Luis Moura	Sybein, Jop	Ubeda, Stephane
Silva, Mario	Szychowiak, Michal	Ueberhuber, C. W.
Slomka, Frank	Talbi, El ghazali	Ugarte, Asier
Smith, Jim	Talcott, Carolyn	Vakalis, Ignatis
Smith, Warren	Taylor, Valerie	Zomaya, Albert
Sobaniec, Cezary	Temam, Olivier	Zory, Julien
Spezzano, Giandomenico	Thakur, Rajeev	Zwiers, Job
Stanca, Marian	Thiesse, Bernard	