Preface

PaCT-99 (Parallel Computing Technologies) was a four-day conference held in St. Petersburg on 6–10 September 1999. This represented the fifth international conference in PaCT series, which take place in Russia every odd year. The first, PaCT-91, was held in Novosibirsk (Academgorodok), 7–11 September, 1991. The second PaCT-93 was held in Obninsk (near Moscow), 30 August – 4 September, 1993. The third, PaCT-95, was organized in St.Petersburg, 12–15 September, 1995 and the last fourth PaCT-97 was held in Yaroslavl 9-12 September, 1997.

PaCT-99 was jointly organized by the Institute of Computational Mathematics and Mathematical Geophysics of the Russian Academy of Sciences (Novosibirsk) and by the Electrotechnical University of St.Petersburg. The purpose of the conference was to bring together scientists working with theory, architecture, software, hardware and solution of large-scale problems in order to provide integrated discussions on Parallel Computing Technologies.

The Conference attracted more than 100 participants from around the world. Authors from over 23 countries submitted 103 papers and there were 2 invited papers. Of those submitted, 47 papers were selected for the conference; in addition there were a number of posters presented. All the papers were internationally reviewed by at least three referees.

As usual a demo session was organized for the participants. Three different tools were submitted (demonstration and tutorial) under the condition that the tools would be free for noncommercial use. One of them is WinALT (Russian Academy of Sciences, Novosibirsk), a software tool for fine-grain algorithm simulation. Another one is DEAled (State Technical University of St.-Petersburg), a tool for the development of real-time systems. The third is PLATINUM, a tool for workload construction on a workstation network run under UNIX.

Many thanks to our sponsors: the Russian Academy of Sciences, the Russian Fund of Basic Research, the Russian State Committee for Higher Education, PARSYTEC (Germany) and the Institute of Computer Based Software Methodology and Technology (Japan) for their financial support. Organizers highly appreciate the help of the Association Antenne-Provence (France).

June 1999

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Wolfgang Händler, the talented scholar and engineer, and one of German computer pioneers, was born in Potsdam, Germany. He studied naval engineering from 1941 to 1944 at the Technical University of Danzig. Then he served in the German Navy.

After the War, he studied mathematics and physics at the University of Kiel from 1945 to 1948 and was awarded a degree in Mathematics. In his thesis “Nomographische Darstellung einer erweiterten Thiele-Transformation” Händler had his first encounter with astronomy. Perhaps this was the origin of his interest in the history of mathematical machines, and the background for his highly interesting lectures on the astrolabe, astronomic chronometers, and ancient calculating devices. (Note that in 1993 Professor Händler prepared a special course and a monograph entitled “Instrumental Mathematics: 2000 Years of Computers”).

In 1958 Wolfgang Händler earned his doctorate from the Technical University of Darmstadt with a dissertation entitled “Ein Minimisierungsverfahren zur Synthese von Schaltkreisen Minimisierungsgraphen.”

From 1948 to 1956 he was employed by the German North-Western Broadcasting Corporation (Research Division Hamburg) working on the theory of communications and the use of computers for improvement of TV pictures. Here, while designing filters, he met up with computers for the first time: BESK in Stockholm and G1 in Göttingen. The young engineer was fascinated, he understood the epoch-making significance of computers, and subsequently devoted to them the whole of his scientific life.

From 1956 to 1959 Wolfgang Händler was with the Telefunken Corporation. He was one of the leading architects of the first transistorized Telefunken computer TR4, the fastest European computer of its time.

From 1959 to 1963 he was Assistant Professor at the University of Saarland, then Professor of Computer Science at the Technical University of Hannover.

Beginning in 1966 he was Professor of Computer Science at the University of Erlangen-Nürnberg, where he founded in 1966 the “Institut für Mathematische Maschinen und Datenverarbeitung (Informatik).”

Professor Wolfgang Händler's main scientific interests were in computer architectures, especially of a non-traditional type, the organization of parallel computing, microprogramming, and the history of mathematical instruments and
machines. He was interested not just in the design and implementation of computers but also in the development of corresponding principles. Brilliant evidence of this was the creation in 1974 of the “Erlangen Classification System, ECS,” later named after him.

The next area that attracted Professor Händler strongly was visualization. The first of Händler’s achievements in this field was related to the minimization graphs explored in his doctoral dissertation. In one of his U.S. patents he described the techniques for presentation and debugging of computer programs by means of an oscillograph. At the end of the 1960s and the beginning of the 1970s Händler began his work in computer graphics and organized Workshops on the man-computer interface.

At the end of the 1970s Professor Händler launched, together with his colleague, physiologist Professor Keidel, a new project on “Data Processing in Computing Devices and Organisms” in which the problems of bionics were examined by a new approach combining the methods and findings from both computer science and the physiology of cognition.

Professor Händler is the author of more than a hundred scientific publications, books and patents. One of his works should be especially noted, namely the paper “Innovative Computer Architecture - How to Increase Parallelism But Not Complexity.” It was the first, introductory chapter of the well-known multiauthor volume Parallel Processing Systems, written by world authorities on methods and tools of parallel data processing. Professor Händler offered in this work a brilliant analysis of modern computer architectures based on his elegant and effective Classification System. Works by Professor Händler laid the foundation for a new trend in computer science related to the idea of combining various computer models within a single structure. A good example of such an approach is the associative model embedded in the universal architecture of the von Neumann type.

Wolfgang Händler was the leader and active participant in several famous projects of parallel computing systems realized in Erlangen: EGPA (Erlangen General Purpose Array), DIRMU (Distributed Reconfigurable Multiprocessor Kit), SUPRENUM (Supercomputer for Numerical Application), and MEMSY (Modular Expandable Multiprocessor System).

Professor Händler was awarded the Distinguished Service Cross (1st class) in 1982 by the President of the Federal Republic of Germany for his contribution to the development of informatics, particularly at the University of Erlangen-Nürnberg. In 1991 he received honorary doctorates from the Universities of Karlsruhe (Germany) and Novosibirsk (Russia).

Professor Händler was one of a glorious cohort of computer pioneers, which included John Atanassov, Arthur Burks, Moris Wilkes, and Konrad Zuse. These talented and noble people saw the purpose of their life and their creative work not simply in building computing machines of enormous power but above all in using this technology for the benefit of mankind.
Wolfgang Händler and International Scientific Cooperation in the Field of Computer Architecture

Professor Wolfgang Händler is well-known as one of the computer pioneers. Being a contemporary and a friend of Arthur Burks and Konrad Zuse, he made a significant contribution to the theory and applications of computing. He was an eminent authority on the architecture of parallel computing systems.

At the same time, Händler was a distinguished organizer of scientific cooperation between different countries. For these activities, professional skill and great erudition are not enough. In addition, one should have highly developed human qualities and possess the art of personal contacts. Händler was generously endowed with these traits.

Professor Händler was the founder of the European Conferences CONPAR devoted to the problems of parallelism. The first Conference of this series was held in his native city of Erlangen in 1981, the second - in Aachen (1986), the third - in Manchester (1988), the fourth - in Zürich (1991), and the fifth - in Lyon (1992).

For the exploration of computer architectures as well as for the development of international cooperation, the Workshops on Parallel Processing by Cellular Automata and Arrays (PARCELLA) were of special importance. W. Händler was one of the founders of this Workshop series.

The PARCELLA Workshops have been focused mainly on parallel computing in regular structures, a subject which was very close to Händler’s interests (it suffices to remember his famous “Horizontal-Vertical Computer”). Moreover, these Workshops were, perhaps, one of the earliest “bridges” between scientists from Western Europe, on the one hand, and from Central and Eastern Europe, on the other. It was an obvious outline of the future cooperation within the framework of united Europe.

Together with Professor Händler, many efforts in the organization of PARCELLA were made by his colleagues from the FRG (R. Vollmar, U. Schendel), the GDR (G. Wolf, W. Wilhelmi), Hungary (T. Legendi), and England (D. Parkinson), among others.

Händler was a constant participant at all PARCELLA Workshops (except the last, the Seventh). And not just a participant! In the Preface to the Sixth PARCELLA (1994) we read: “He didn't restrict his engagement to the program committee's activities and as a honorary lecturer, he also provided participants from East Europe with recent results from the Erlangen IMMD and supported their scientific visits there. It is a good opportunity here to thank him for his valuable gifts of computer journals and computer science literature to the former Academy of Sciences and to the University of Potsdam. We were proud to welcome Professor Wolfgang Händler as an honorable member of the Program Committee.”

Recalling the history of the establishment of our PaCT Conference series, we feel a deep gratitude to and a profound respect for Professor Händler. It may be supposed that the PaCT series founded by Professor Nikolay Mirenkov in 1991 was, in a sense, a further elaboration of basic ideas brought by Händler to the COMPAR and PARCELLA Conferences. Actually, the PaCT Conferences continue and extend the subject of parallel methods and architectures. Special attention in PaCT is paid to the
cooperation between East and West. Remember that all the PaCT Conferences were held in Russia, but that each of them receives 50% of its participants from a dozen countries of Western Europe and other regions.

The very beginning of the PaCT Conferences, the first Keynote Lecture, was Professor Händler’s brilliant lecture “Nature Needed Billions of Years ... ” presented on 7 September 1991 at the opening of PaCT-91. Concluding this lecture, Professor Händler said:

“The teraflop-computer will come in a remarkable number at the end of this century. There is no doubt about it. The teraflop-multiprocessors will represent a means to an end - to numerical simulation, to huge data bases, to artificial intelligence, to expert systems and to many things else. The mail question will nevertheless be whether we will wisely utilize these tools to preserve our world and its natural sources from destruction and to prevent the humanity from serious conflicts or wars.”

Returning to Erlangen after PaCT-91, Händler prepared a “Report on a Professional Business Trip,” a quite interesting document reflecting all the important features of his visit to Russia. First of all, Professor Händler describes in detail the main reports of the Conference. But not just the reports! He also paid sufficient attention to the cordial atmosphere of the meeting, stimulating creative contacts between scientists from different countries. Moreover, the Report was adorned by numerous photos.

Thus, Händler describes in his Report the steamer excursion along the Ob Sea (an artificial reservoir near the Academic Village) organized for the participants on the last day of their stay in Novosibirsk. It was a marvelous “velvet” September day. The ship moored in one of the bays, where the hosts had built a kind of an improvised restaurant, right on the clean sandbar. The ordinary self-made wooden tables were served with a lot of delicacies. The durable Armenian cognac and the fresh shashlik (being prepared “on-line,” right hear, on the beach) represented only a minor part of the menu. This picnic appears in one of Händler’s photos. One can see the crowd of scientists sitting around long tables and the ship waiting at a distance to bring them to the city in the evening ... “Undoubtedly, this excursion will always remain in the memory of all participants” – concludes Professor Händler.

The next of Professor Händler’s visits to Russia was connected with an outstanding event. On 10 February 1992, he received an Honorary Doctorate from the University of Novosibirsk. It should be emphasized that Wolfgang Händler was the first scientist awarded this newly established honorary title. In a special resolution of the Academic Council of the University of Novosibirsk it was stated:

“... to award the degree of Honorary Doctorate from the University of Novosibirsk to W. Händler, Professor of the Erlangen-Nürnberg University, for his outstanding contribution in studying informatics problems, development of methods of parallel data processing, study and comparative analysis of multiprocessor system architectures, for his great success in spreading scientific knowledge, and enduring efforts in development of scientific cooperation between people of different countries.”

To join the Ceremony of Conferment, the Rector of the Erlangen-Nürnberg
University, Professor Gotthard Jasper, and the Head of the AI Department, Dr. Herbert Stoyan, accompanied Professor Händler to Novosibirsk. The festive Ceremony was held in the Assembly Hall of the House of Scientists (Novosibirsk, Academic Village). After the addresses of Novosibirsk scientists and the presenting of the diploma, Professor Händler delivered a remarkable Inaugural Lecture “History of Computing - A Taxonomic Approach.” During intermissions in the ceremony, the Hall resounded with classical music performed by a symphonic orchestra.

At the PaCT-91 Conference, aside from the aforementioned Keynote Lecture, Professor Händler presented a regular paper “Vertical Processing in Parallel Computing Systems” (with Ya.I. Fet). At the next PaCT Conference (Obninsk, Russia, 1993) he presented a paper “Why We Favour Pyramids” (with N.N. Mirenkov). Professor Händler’s report to the PaCT-95 (St. Petersburg, Russia, 1995) “Parallel Processing: Increasing Performance and Dependability,” was presented, on his behalf, by the author of these lines. The PaCT-97 Conference (Yaroslavl, Russia, 1997) found Professor Händler unable to attend.

Wolfgang Händler was an active organizer and a permanent member of the Program Committees of all previous PaCT Conferences. Today, Professor Händler is no longer with us. However, the participants of the PaCT-99 Conference as well as of future PaCTs (already in the twenty-first century) will keep alive the memory of Wolfgang Händler, one of the prominent scientists of the twentieth century, who has been and remains our true friend.

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