Foreword

Welcome from the General Co-Chairs

Twenty years have passed since we met for the first time at Hiroshima University (1984) and started a series of Workshops, Working Conferences and, more recently, Symposia that were focused on exploring the concept of a universal high-level visual programming language. Some 20 years later, we must now recognize that the concept was only a dream!

Nevertheless, the importance of visual communication cannot be overestimated. Visual modelling has become widespread, especially with the success of UML, whose languages, as well as their predecessors, have been the subject of many papers at the VL series. Nor is the domain of visual techniques restricted to software engineering, as we have hosted over the years original and innovative usage of pictures and diagrams, in design, architecture and even biology. So, it looks as though visual communication is most useful whenever we have a domain which can be structured in terms of concepts of entities, relationships, processes or configurations, undergirded by some metaphor or notation shared by a given community.

As many cognitive scientists have shown, our brain works along two separate channels: a linguistic one (coinciding with the absorption of text) and a visual one (acquiring pictorial components as seen on the screen). Neither of these is consistently dominant, nor is their ratio fixed for all individuals. An integration of different kinds of representations is certainly a viable approach to new programming or modelling languages that may hide details, and provide insight into the relevant aspects of phenomena of interest.

This was the driving force behind the renaming of the conference series to Human Centric Computing. It was recognised that what we are really up to is putting the user—any human user—at the centre of our design, development and testing of computer systems. This viewpoint highlights the importance of human-computer interfaces, their relevance in the success (or failure) of a new system. It is essential that the system be well understood by the user, and direct manipulation interfaces have been well-suited to this task, although new strategies that employ other human senses (gestures, touch, speech) are coming of age.

Putting Visual Languages back into the name of this conference series acknowledges the fact that visual technologies are those which still lie at the core of most forms of interaction between humans and other humans, even mediated by computer-based systems, including those allowed by the new portable communication devices, and that new specific problems in terms of usability, reliability, expressiveness, scalability etc. arise from the diffusion of visual techniques into new territories.

We are very happy to host this new edition of an old series in Rome, a town where old and new come shoulder to shoulder; where many world-renowned masterpieces find their homes; and where, as participants will notice, communication has developed over the centuries into an art.

We hope that our meeting in Rome will prove that sharing knowledge and experience gained from designing, implementing and testing human-centred systems can pave the way for the new systems of the future.

Stefano Levialdi and Paolo Bottoni
General Co-Chairs of VL/HCC 2004
Welcome from the Program Chairs

Welcome to Rome and the twentieth anniversary edition of the IEEE Visual Languages Conference Series. For this anniversary edition, we were pleased to receive 65 full-length paper submissions, and 16 technical note submissions. Through a rigorous peer review process in which each paper was assigned to at least three members of our international program committee, we accepted 21 of the 65 full-length submissions as full-length papers; another 17 of these full-length submissions were accepted as technical notes. In addition, four of our eight technical note submissions were accepted.

It has been said that "all roads lead to Rome". When the participants in the twentieth edition of the Visual Languages Series converge there in September, 2004, they will be certainly coming on most of those roads. Indeed, as has been a hallmark of the Visual Languages Conference Series, this year's edition boasts a truly international flavour, with researchers hailing from all corners of the globe, including Asia, the South Pacific, North America, and, of course, Europe.

Our international diversity is complemented by a diversity of topics that reflect the eclectic nature of our research community. If you're interested in visual language theory, be sure to attend the paper session on visual language models and formalisms. If you're interested in empirical studies and human-computer interaction, you have several sessions to choose from, including a session on empirical studies of end-user programming, and a session on the design and evaluation of end-user programming environments. Specialists in specific domains will be pleased to find sessions on topics that have traditionally been popular in this community: visualization, UML and visual modelling, end-user programming, and graph layout. Given the range of topics that will be presented, we trust that there will be something to inspire and intrigue just about any researcher in the community.

We are happy to bring to the conference two distinguished keynote speakers who are certain to stimulate lively conversations. Paul Dourish, a professor of computer science at the University of California–Irvine, will consider the cultural, social, and cognitive aspects that influence programming activities and make software development an ‘embodied phenomenon’. Margaret-Anne Storey, a professor of computer science at the University of Victoria, Canada, will address the usefulness of advanced graphical features in software development tools, with a particular focus on how interactive graphical representations developed in academia can enhance industrial development tools.

We are also pleased to continue at this conference the HCC/VL tradition of a graduate student consortium. The inaugural graduate student consortium was organized by Margaret Burnett at the 2003 HCC Symposia in Auckland; it was supported by travel grants from the U.S. National Science Foundation. For many who attended HCC '03, the interactive format of this graduate consortium was a highlight of the conference. Backed by continued funding from the U.S. National Science Foundation, and a new organizing committee and panel consisting of John Pane, Margaret Burnett, Mary Beth Rosson, and Steve Tanimoto, this year's graduate student symposium is certain to attract as much attention as the previous one.

Finally, we would like to express our gratitude to all the people who contributed to the scientific quality of the technical program being presented at the conference. We would like to thank all of the authors for submitting their papers and for being open to the criticisms and suggestions of the referees. Likewise, we gratefully acknowledge the members of our international program committee, who generously donated their time and expertise to the review process.

Christopher Hundhausen and Genny Tortura
Technical Program Co-Chairs of VL/HCC 2004
Graduate Student Consortium: Designing for Diversity in End-User Development Tools

Our society has evolved into two distinct classes: the information haves and the information have-nots. Since information is power, this class distinction poses a barrier to the latter group’s ability to advance in terms of career and influence, both individually and collectively. The development of end-user programming tools to operate on task information, for example through complex queries, manipulations, input-output connections, etc., will potentially increase this barrier. It will no longer be sufficient to find and consume information others have created. Employees and citizens will increasingly be expected to generate and manipulate information in creative ways to solve complex problems. There is an urgent need to consider the accessibility of these more powerful information tools, to close the gap between the haves and the have-nots.

Researchers have demonstrated that interactive systems often embody value propositions—for example, implying that competition is desirable, or that tasks should be done on an individual basis. Similarly, a person who experiences difficulty in using a high-level programming language or tool receives the message: “if you cannot figure out how to do this, then there is something wrong with you.” While such a value judgment may be motivating to a programmer who is keen to learn a new skill or technique, it can quickly deflate the ambitions of end users with deficiencies in educational background, are of depressed socio-economic status, or with physical or cognitive disabilities, non-traditional learning styles, or little exposure to information technology. Rather than thinking, “I just have to try harder,” they might think, “I’m not good enough to use this tool.” We must strive to design for inclusiveness so that everyone will have the opportunity to benefit from the power that these tools offer.

At the 2003 Human-Centric Computing Conference, the U.S. National Science Foundation (NSF) sponsored a graduate student consortium on the theme of making programming languages and environments suitable and useful for the educationally disadvantaged. The workshop brought together graduate students, faculty mentors, and conference attendees working on related research projects. The event produced considerable excitement and community building around approaches for reaching educationally disadvantaged populations. This year, the NSF continues its sponsorship of this graduate student consortium. The research theme of this year’s event is: How can researchers and designers of end user development environments better address user diversity issues? Programming by users who are disadvantaged by their background, education, learning style, or physical characteristics is a universal access problem in two senses: access to programming tools by these disadvantaged populations, and access to the information services that the use of these tools enables.

In this event, we look beyond surface-level interactions with computers to consider programming as an area of true information power. Ensuring that designers of programming languages and tools consider the needs of populations who historically have been overlooked in information technology will increase these groups’ chances to learn and use the more powerful tools becoming part of everyday information literacy. At the same time, such efforts may lead researchers to identify programming metaphors and techniques increasing the usability of their languages and environments. In this context, programming is broadly defined to include most types of problem-solving systems, including CAD systems, spreadsheet systems, voice mail programming, building macros, and multimedia/web authoring. The student research presented here broadly spans this research theme, addressing the special needs of groups such as women, Native Americans, older adults, people with cognitive or physical disabilities, educationally disadvantaged populations, and minority athletes and coaches. Approaches include the use of visual languages, natural language, audio, and voice recognition. Several researchers focus on testing and developing error-free software, a particularly difficult area for end-user populations.

John Pane (chair), Mary Beth Rosson, Margaret Burnett, and Steve Tanimoto