



Proposal to host the 16th IAPR International Conference on Discrete Geometry for Computer Imagery

Strasbourg - April-May 2011



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1 Preliminaries

This document presents our application for the organization of the DGCI conference on April-May 2011. We would be very glad to host the 16th edition of DGCI conference at the University of Strasbourg. The University of Strasbourg (UdS) became a single entity last February, embracing in a vast conglomerate three institutions: Louis Pasteur University, dedicated to the sciences, medicine and technology – it boasts a Fields mathematics medal in 1958 and Nobel Prize for Chemistry in 1987 – Marc Bloch, the Social Sciences University, and Robert Schuman, the University of Law, Political Science and Economics. The 42,000 students (including 21% foreign students) plus the 6,000 lecturers and other staff make it the France's largest multi-disciplinary university.

The main Computer Sciences, Image Processing, robotics, automation and Remote Sensing laboratory (Laboratory federated by the image) in Strasbourg, the LSIIT Lab, is associated to this proposal since all organizing persons are members of this lab. The LSIIT Lab is directed by Fabrice Heitz (Professor working in Image analysis) and is composed of more than 90 researchers and 70 PhD students.

The conference would take place in the ENSPS (*École Nationale supérieure de Physique de Strasbourg*), an engineering school in the Illkirch campus of the UdS.

The proposed program chairs are composed of a group of researchers actively contributing to the DGCI's community (Digital geometry, tomography and topology and mathematical morphology).

In this document, we first present the city of Strasbourg, The University of Strasbourg, the LSIIT Lab and ENSPS. Then, we give details on the scientific and financial aspects of our proposal.

2 Welcome to Strasbourg

Capital of the Europe of democracy and human rights.

The 16th DGCI will find in Strasbourg an ideal host, the cradle of a long tradition of welcome and of 2000 years of contact with Europe and the world.



3 Access

3.1 By air

- **Aéroport d'Entzheim** (Strasbourg International Airport) is an airport located in Entzheim and 10 Km west-southwest of Strasbourg.
- **EuroAirport Basel-Mulhouse-Freiburg** is an international airport 6 km northwest of Basel (Switzerland), 140 km south of Strasbourg, and near Freiburg (Germany).

3.2 By rail

Strasbourg is connected to Paris by the high-speed TGV train (2h20mn from Paris) and by regular train to all the major French cities and to several cities in Germany and Switzerland.

3.3 By road

Strasbourg is on the border of Germany and it is one hour away from Basel (Switzerland) and 4h20mn from Paris.

3.4 Public transportation

The extensive network of buses and tramway of the C.T. S. (Compagnie des Transports Strasbourgeois - Strasbourg's Company of Transportations) enables rapid and easy transports from one place to another in the city and its suburbs.



4 Strasbourg: Capital of the Europe of democracy and human rights

Strasbourg is over 2000 years old. Founded by the Romans in the year 12 BC, the city was first a military camp protecting the northern border of the Empire against “Barbarian” incursions. A monument, the Janus Aqueduct, designed in 1988 by the illustrator Tomi Ungerer as a tribute to his native city, symbolizes the bi-millennium whilst emphasizing the profoundly bi-cultural dimension, both Latin and Germanic, of Strasbourg.

Where there is water, there will be islands, and the most well-known one in Strasbourg, the Grande-île, is home to the historic centre of the city: its architectural ensemble is on the UNESCO World Heritage List since 1988.

When the Council of Europe, now consisting of 47 Member States, was created in 1949, the question arose as to which city would be best placed to accommodate this organization responsible for promoting European unity, democracy, human rights and political pluralism. Strasbourg was chosen for the reasons explained by Ernest Bevin, the British Minister of Foreign Affairs: “We were looking for a centre that could both be convenient for all European nations and come to symbolize European unity. Strasbourg was a natural choice. This great city had been witness to such breed of human stupidity that attempted to settle its affairs through war, cruelty, and sheer destruction”.

In total, Strasbourg is home to some twenty European institutions or international cooperation organizations. Like Geneva and New York, Strasbourg, without being a State capital, is no less an international capital with a strong diplomatic presence (46 embassies, about thirty consulates). Strasbourg is therefore home to:

- **the Council of Europe and its Parliamentary Assembly**, not forgetting the various bodies attached to it:
 - the European Court of Human Rights, guardian of humanist values and created almost exactly fifty years ago
 - the Congress of Local and Regional Authorities, established in 1994 to promote local autonomy
 - the European Youth Centre, established in 1972 to educate and inform young people on the Council’s pan-European approach
 - the European Pharmacopoeia, set up in 1964 to guarantee the quality of medicines and draw up the standards applicable to its member countries
 - the European Audiovisual Observatory, which has been gathering and circulating information on the European audiovisual industry since 1992



- **the European Parliament**, whose members have been elected by direct universal suffrage since 1979. Its codecision powers have extended out by the different treaties and its areas of competence have been widened (the environment, transport, regional development, budget, approval of the appointment of European Commissioners, etc.)



- **The European Science Foundation**, has brought together since 1977 some 77 European organizations from 30 European countries, with the main mission of promoting scientific research, improving European cooperation in this field in conjunction with the Brussels Commission and contributing to the pooling of resources. It coordinates projects, organizes conferences and workshops, networks skills and puts forward prospective investigations
- **and many others european institutions:** The Assembly of European Regions, The European Ombudsman, The Eurocorps, etc.



5 A rich university offer

Its history is run through by the thread of a double culture, French and German. The University of Strasbourg (UdS) became a single entity last February, embracing in a vast conglomerate three institutions: Louis Pasteur University, dedicated to the sciences, medicine and technology – it boasts a Fields mathematics medal in 1958 and Nobel Prize for Chemistry in 1987 – Marc Bloch, the Social Sciences University, and Robert Schuman, the University of Law, Political Science and Economics. The 42,000 students (including 21% foreign students) plus the 6,000 lecturers and other staff make it France's largest multi-disciplinary university.

Driven, with its 2,500 researchers, by the ambition to constitute one of the major centers of university research in Europe, UdS is involved in numerous partnerships, such as EU COR (Confederation of the Universities of the Upper Rhine), a tri-national network of universities including Basel in Switzerland, Karlsruhe and Freiburg in Germany, and Mulhouse in France. It is also a founder member of the LE RU, the League of European Research Universities. Its outstanding performances in particular fields such as molecular biology, technology, chemistry, materials physics and space sciences have contributed for many years to its international reputation.



Recognized as a centre of excellence and innovation, Strasbourg has attracted many other entities, universities or institutes with a national, international and European scope. Here are just a few examples:

- **the International Space University (ISU):** founded in 1987, it was initially located in Massachusetts, in the United States, until an international competition chose Strasbourg in 1994. The ISU trains students, future professionals, astronauts and experts in a multi-disciplinary culture adapted to space projects. All the knowledge of the existing space bodies is concentrated there. This scientific experience, unique, attracts specialists from all over the world.
- **the Human Frontier Science Program (HFSP):** created by G8 on a Japanese initiative, it has been based in Strasbourg since 1989. This international program cultivates fundamental research in the field of the mechanisms of living organisms and complex biological systems.
- **the IRCAD (Research Institute against Cancer of the Digestive Tract):** its basic and applied research programs as well as its teaching of new surgical technologies have made its worldwide reputation. This exceptional structure covering 8000 m², established in 1994, receives 3,000 surgeons every year, covering all the different specialties.
- **the ENA (National School of Administration):** created in 1945, it was decentralized to Strasbourg in 1992, thus increasing the city's top level European and academic standing. The ENA trains the future top civil servants for the French administration, but is also attended by students of over a hundred nationalities.



6 Laboratory: Image Sciences, Computer Sciences and Remote Sensing Laboratory

6.1 Presentation

The Image Sciences, Computer Science and Remote Sensing Laboratory (LSiIT) is a research unit affiliated with CNRS (National Center for Scientific Research) and the University of Strasbourg (UMR 7005). Its research and teaching activities lie in the field of Information and Communication Science and Technology (ICST). LSiIT performs pure and applied research in a variety of domains including computer sciences, robotics, automation and control, image processing and remote sensing. For the past three decades, the laboratory has developed a recognized expertise in the specific field of image sciences, through researches and developments in optical imaging, 3D digital image modeling and processing, computer vision, computer graphics and animation, geometric modeling, virtual reality, visual servoing, scientific visualization and rendering, image classification and data mining.

LSiIT privileged application domain is related to the use of advanced information technologies in biomedicine and health-care: medical imaging, medical and surgical robotics, geometrical modeling and rendering of anatomical structures, surgical planning, augmented reality in medical applications and health informatics.

6.2 Research groups

- Computer Graphics and Programming
- Models, Images and Vision
- Control, Vision and Robotics
- Networks and Protocols
- Imaging and Scientific Parallel Computing
- Data Mining and Theoretical BioInformatics
- Remote Sensing, Radiometry and Optical Imaging

6.3 Intergroup Research Programs

- Medical Imaging, Medical and Surgical Robotics
- Virtual and Augmented Reality, Simulation and High Performance Computing
- Embedded Mobile Environments
- Multivariate physical Imaging

6.4 Research and Teaching

LSIIT researchers are involved in courses at the undergraduate and postgraduate level at Strasbourg University (License and Master's degree in Computer Science), ENSPS (Strasbourg National Engineering School in Physics) and at the postgraduate school in Mathematics and Information Science. LSIIT hosts about 60 PHD students, 30 graduate and undergraduate students and welcomes yearly 10 visiting scientists from various Institutes or Universities.

The Image Sciences, Computer Sciences and Remote Sensing Laboratory (LSIIT) is a mixed research unit (UMR 7005) of the CNRS (Regional Alsace Delegation) and of the University of Strasbourg. It is an interdisciplinary laboratory federated by the image.

The major research topics are Computer Sciences, Signal Processing, Automatics and Remote Sensing.

It depends on the Department of Science & Technology of Information & Communication (STIC, setion 7) and the Department of Space Sciences (SDU, section 19) of the CNRS. It is administratively attached to the National Engineering School of Physics of Strasbourg (ENSPS).

7 Conference Hall: ENSPS

The **École Nationale Supérieure de Physique de Strasbourg** (ENSPS) (*National school of higher education in physics of Strasbourg*) is a French engineering school in the University of Strasbourg. Opened in 1970, the ENSPS is a school dedicated to the education of engineers in different specialities related to physics and electrical engineering. Located on the Esplanade campus of Strasbourg, classes of about 15 students achieved the school at its beginning. In 1994, the school moved to the Pôle API, in Illkirch-Graffenstaden, to be closer to laboratories and specialised companies. Nowadays, almost 100 students graduate every year.

As most schools of engineering in France, the ENSPS recruits its students after two years of post-bac intensive studies. The education at the school lasts for three years, and includes theoretical and practical education, training in companies and laboratories. The school offers different specialities: Image processing; Software and network engineering; Automatic control engineering; Biophysics; Electronics; Photonics; Physics and modeling.

Each of these options can be obtained with a Master degree from the University along with the Master of Engineering degree.

The LSIIT Lab is localized at the ENSPS.

8 Accommodation

The city of Illkich-Graffenstaden or the city of Strasbourg offer an important choice of accommodation. Even if no negotiation has been done yet with hotels, we will propose a list with prices from 60 to 90 euros.

9 Program outline

Depending on the student holidays at ENSPS, we plan to organize the conference from 27th to 29th of April 2011. If this period does not match with ENSPS availabilities, another possible slot is 4th to 6th May (one week after). This point should be cleared soon.

We can sketch the program as follows:

- Wednesday
 - 8h00 – 9h00: Registration and welcoming talk
 - 9h00 – 17h30: first conference day
 - in the evening: *Social event* and cocktail (To be confirmed)
- Thursday
 - 9h00 – 18h00: second conference day
 - in the evening: Conference Gala
- Friday
 - 9h00 – 15h30: third conference day
 - 15h30 : Farewell

Using this program we can estimate the number of oral presentations to 30 with 3 invited talks and a 2 hour poster session on Wednesday afternoon (25 minutes for the oral presentation). Obviously all these figures would be adapted according to the article selection process.

Among the conference program, slots will be scheduled for the steering committee meeting or the TC18 meeting.

10 Scientific policy

According to previous editions, we consider the classical DGCI topics:

- Discrete and Combinatorial Topology
- Models for Discrete Geometry
- Geometric Transforms
- Surfaces and Volumes
- Discrete Shape Representation
- Discrete Tomography
- Discrete and Combinatorial Image Analysis
- Morphological Analysis
- Shape Recovery
- Image Generation and Reconstruction
- Visualization

Concerning the overall process, the submission of full papers will be reviewed by the DGCI program committee and selected for either oral or poster presentation. The technical aspects of this process will be managed by the ConfTool system (used since the 12th edition). The final decision step will be done by the Program Chairs with help from the Steering Committee and with a possible backtrack to the reviewers. We plan to publish the proceedings with Springer-Verlag in the LNCS series. We plan to publish extended versions of high ranked papers of the conference in two special issues of Top level journals. There are some possible journals: Journal of Mathematical Imaging and Vision, Discrete Applied Mathematics, Pattern Recognition, Computers & Graphics, Graphical Models or Image and Vision Computing. Again, the Steering Committee advices would guide us in this choice.

The invited speaker list should be decided in coordination with the Steering Committee, several options should be investigated and we just address here a first thought (according to topics):

- Combinatoric aspects of image:
 - Jean Berstel (France, <http://www-igm.univ-mlv.fr/~berstel/>)
 - Laurent Vuillon (France, <http://www.lama.univ-savoie.fr/~vuillon/>)
- Shape representation, topological properties of digitization schemes, digital topology:
 - T. Yung Kong (USA, <http://www.cs.qc.edu/cgi-bin/faculty.cgi?fid=kong>)
 - Longin Jan Latecki (USA, <http://www.cis.temple.edu/~latecki/>)
- Digital tomography:
 - Frank Natterer (Germany, <http://wwwmath.uni-muenster.de/u/natterer/>)
 - Larry Shepp (USA, <http://www.stat.rutgers.edu/~shepp/>
http://en.wikipedia.org/wiki/Larry_Shepp)
- Mathematical Morphology and applications:
 - Philippe Salembier (Spain, http://gps-tsc.upc.es/imatge/_Philippe/Philippe.html)
 - Petros Maragos (Greece, <http://cvsp.cs.ntua.gr/maragos/>)
 - Michael H.F. Wilkinson (Netherlands, <http://www.cs.rug.nl/~michael/>)
 - Jos Roerdink (Netherlands, <http://www.cs.rug.nl/~roe/>)

11 Social Program

Two possibilities :

- **Boat trip in Strasbourg (Bateaux mouches)**

Main tourist attraction of Strasbourg, the city discovery downstream. Walk all around Strasbourg, "big island" declared world-wide heritage of humanity by UNESCO. Discover the architectural wealths of the Petite France district, the Tanners, the Covered Bridges, the panoramic Vauban terrace, impressive lay and religious buildings, the German neighborhood (erected between 1870 and 1918), and of the European neighborhood with, notably, the parliament, the Council of Europe and the Palace of the Human Rights.



- **Visit of the historical wines cellar of the hospices of Strasbourg**

The historic cellar of the hospices of Strasbourg is a wine cellar built between 1393 and 1395 in the enclosure of the civil hospital. The cellar of the hospices of Strasbourg quickly became a rich land owner. Many patients paid their cares by bequeathing bits of land that, put end on, formed a vast domain. In 1716, a fire ravages the hospital, but it spares the cellar, the bakery and the chapel. During the 20th century, the wine-growing activity will wane little by little, but in 1995, under the impulse of Alsatian winegrowers, the cellar resumes its activities under the form of a co-operative. It is deeply renovated and sells today about 150 000 bottles per year : Gewurztraminer, Muscat of Alsace, Riesling and Gray Pinot. The historic cellar is renowned for the quality of its wines but forbids itself all advertising, and reinvests all its profits into the purchase of medical equipment.



12 Chairs

12.1 Program chairs

- **Mohamed TAJINE (General chair):** Mohamed Tajine is Since 1999 Professor of computer science at the University of Strasbourg and member of « Laboratoire des Sciences de l'Image, de l'Informatique et de la Télédétection », (LSIIT) UMR 7005 CNRS-UdS. He is the Head of the team «Géométrie Discrète et Morphologie Mathématique (Digital Geometry and Mathematical Morphology)» of the LSIIT Lab (This team is composed by 7 permanent members and 5 Ph. D. students). His research interests include digital geometry, image analysis, digital tomography, Fractal, combinatorics of words and logic. He is member of Program Committee of several conferences and Reviewer of books, journal articles, conference papers, Ph.D. Theses, Habilitations. He co-organized three national Workshops (~60 participants/Workshop). Mohamed Tajine was until the end of 2008 President of the Scientific and Pedagogical Council of the IUFM of Alsace and Member of the governing board of the IUFM of Alsace.
- **Christian RONSE:** Christian Ronse is since 1992 Professor in Computer Science at the University of Strasbourg and member of the team «Géométrie Discrète et Morphologie Mathématique» of the LSIIT UMR 7005 CNRS-UdS. His research interests include mathematical morphology, image analysis. He is member of the Editorial Board of the *Journal of Mathematical Imaging and Vision* since 2005, Program Chair of the 7th ISMM (2005), Co-organizer of the 11th TFCV Workshop and of a one-day workshop of the GDR ISIS, Member of Program Committee of several conferences; Reviewer of books, journal articles, conference papers, Ph.D. theses and Habilitations.
- **Alain DAURAT:** Alain Daurat is since 2001 Assistant Professor (Maître de conférences) at the University of Strasbourg and member of the team «Géométrie Discrète et Morphologie Mathématique» of the LSIIT UMR 7005 CNRS-UdS. His research interests include digital tomography, digital geometry, image analysis, combinatorics of words. He is member of Program Committee of several conferences and Reviewer of journal articles, conference papers, Ph.D. Theses. He received the Prize of AFIT (French association in Theoretical Computer Science) in 2001 for the PhD Thesis.
- **Nicolas PASSAT:** Nicolas Passat is since 2006 Assistant Professor at the University of Strasbourg and member of the team «Géométrie Discrète et Morphologie Mathématique» of the LSIIT UMR 7005 CNRS-UdS. His research interests include image analysis, medical imaging, digital topology. He is member of Program Committee of several conferences and Reviewer of journal articles, conference papers.

12.2 Local Organizing Committee

Besides Alain Daurat, Nicolas Passat, Christian Ronse and Mohamed Tajine, the organizing committee will also comprise:

- **Etienne BAUDRIER:** Etienne Baudrier is since 2008 Assistant Professor at the University of Strasbourg and member of the team « Géométrie Discrète et Morphologie Mathématique » of the LSIIT UMR 7005 CNRS-UdS. His research interests include image analysis, digital tomography, digital topology.
- **Marie-Andrée JACOB-DA COL:** Marie-Andrée Jacob-Da Col is since 1998 Assistant Professor at the University of Strasbourg and member of the team « Géométrie Discrète et Morphologie Mathématique » of the LSIIT UMR 7005 CNRS-UdS. His research interests include image analysis, digital tomography, digital topology.

This committee will be reinforced by the PhD students of the team «Géométrie Discrète et Morphologie Mathématique» of the LSIIT UMR 7005 CNRS-UdS.

13 Financial plan

According to the previous DGCI editions, we base our financial plan on 80-100 participants with a participation fee between 150 and 210 euros (with a special fee for students and IAPR members if the IAPR supports the conference). The table details the financial plan which is quite stable according to the number of participants and balanced for 80 persons). The registration fee includes: the proceedings, the lunches, the excursion and the conference gala.

The possible sponsors are:

- The University of Strasbourg
- CNRS
- The City of Strasbourg
- The City of Illkirch-Grafenstaden
- Région Alsace
- Département du Bas-Rhin

# Participants	60	80	100
Registration fee (~190/p)	11400	15200	19000
ENSPS support	2500	2500	2500
Other sponsors	3500	3500	3500
SubTotal	17400	21200	25000
Conference Hall	3000	3000	3000
Proceedings (~ 30 /ex. + 10 extra)	2100	2700	3300
Lunches (~15 /p /lunch)	3150	4050	4950
Bags, notebook,... (~5 /p)	300	400	500
Coffee breaks (~3 /p /break + 10 extra)	1050	1350	1650
Gala (~50/p + 10 extra)	3500	4500	5500
Invited speakers (~3*750)	2250	2250	2250
Excursion	1850	1950	2050
Organisation	1000	1000	1000
SubTotal	18200	21200	24200
Total	-800	0	800

14 Schedule and deadlines

Based on the hypothesis that the conference will be on 4-6 May:

- Submission: beginning of December 2010
- Notification: beginning of February 2011
- Camera ready: beginning of Mars 2011
- Conference: 4-6 May 2011