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SCHOOL ON MATHEMATICAL PROBLEMS IN IMAGE PROCESSING

(4 - 22 September 2000)

Co-sponsored by Scuola Internazionale Superiore di Studi Avanzati (SISSA), Trieste, Italy, and Scuola Normale Superiore di Pisa, Italy

CONFERENCE PROGRAMME

18 - 22 September

ALL LECTURES WILL BE HELD IN THE MAIN LECTURE HALL, MAIN BUILDING

Monday, 18 September

9:00-10:00 S.-C. Zhu (Ohio State University, Columbus, U.S.A.)
Stochastic modelling of visual patterns: from descriptive to generative methods.

10:15-11:15 Y. Wu (University of California, Los Angeles, U.S.A.)
Conception and perception of visual complexity.

11:45-12:45 T. Chan (University of California, Los Angeles, U.S.A.)
A unified variational model for image restoration and inpainting.

14:30-15:30 Y. Meyer (Ecole Normale Supérieure de Cachan, France)
Wavelets vs non-linear Fourier for still image compression.

15:45-16:45 F. Cao (Ecole Normale Supérieure de Cachan, France)
Approximation of plane curve evolution driven by a power of the curvature.

Tuesday, 19 September

9:00-10:00 S. Casadei (M.I.T., Cambridge, U.S.A.)
Perceptual organization of image contours.

10:15-11:15 M. Bertalmio (University of Minnesota, Minneapolis, U.S.A.)
Image inpainting and PDE's on implicit surfaces.

11:45-12:45 A. Braides (SISSA, Trieste, Italy)
Some variational problems involving curvatures arising from computer vision.

14:30-15:30 A. Desolneux (Ecole Normale Supérieure de Cachan, France)
Meaningful events and applications to image analysis.

15:45-16:45 P. Frosini (Università di Bologna, Italy)
Size functions and natural pseudodistances: a geometrical-topological approach to shape recognition.

please turn over

Wednesday, 20 September

9:00-10:00 F. Dibos (Université de Paris IX, France)
A coarea model for restoration of grey levels and color images.

10:15-11:15 C. Mantegazza (Scuola Normale Superiore, Pisa, Italy)
Smooth evolutions of hypersurfaces.

11:45-12:45 F. Guichard (Vision-IQ/Poseidon, Paris, France)
(tba)

14:30-15:30 P. Monasse (Ecole Normale Supérieure de Cachan, France)
Contrast invariant image representation and applications.

15:45-16:45 L. Vese (University of California, Los Angeles, U.S.A.)
A common level set framework for active contours and Mumford-Shah segmentation.

Thursday, 21 September

9:00-10:00 R. March (Istituto per le Applicazioni del Calcolo, Roma, Italy)
Variational approximation of Blake and Zisserman functional.

10:15-11:15 Y. Gousseau (Ecole Normale Supérieure de Cachan, France)
Distribution of shapes in natural images.

11:45-12:45 M. Nahon (Yale University, New Haven, U.S.A.)
Blaschke product and applications to signal and image processing.

14:30-15:30 A. Chambolle (Université de Paris IX, France)
Approximations of the Mumford-Shah functional.

15:45-16:45 P. Kornprobst (INRIA, Sophia Antipolis, France)
Relaxed problems in image analysis.

Friday, 22 September

9:00-10:00 S. Solimini (Università di Bari, Italy)
Regularity techniques for free discontinuity problems.

10:15-11:15 J. Sethian (University of California, Berkeley, U.S.A.)
(tba)

11:45-12:45 S. Masnou (Université de Paris VI, France)
Variational formulation of the disocclusion problem.

14:30-15:30 J.-M. Morel (Ecole Normale Supérieure de Cachan, France)
Mathematical morphology and its applications to shape recognition.

15:45-16:45 J. Shah (Northeastern University, Boston, U.S.A.)
Extensions of segmentation functionals.

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Directors:
L. Ambrosio (Scuola Normale Superiore, Pisa, Italy)
G. Dal Maso (SISSA/ISAS, Trieste, Italy)
J.-M. Morel (Ecole Normale Supérieure de Cachan, France)

COURSE SCHEDULE

VENUE: ICTP MAIN BUILDING

THE COURSES WILL BE HELD IN THE MAIN LECTURE HALL

COMPUTER DEMONSTRATIONS WILL BE HELD IN THE COMPUTER LAB
(LOBBY - OPPOSITE THE BLUE ROOM)

Week 1 (4 - 8 September)

Monday, 4 September

8:30-12:00 Registration and administrative formalities

14:00-14:15 Opening

Courses

14:15-16:15 A. Chambolle (Université de Paris IX, France)
Functions of bounded variation and numerical approximation of variational problems in image processing.

16:45-18:45 F. Guichard (INRETS LIVIC, Arcueil, France)
Image iterative smoothing and PDE's.

Tuesday, 5 September - Friday, 8 September

Courses

8:30-10:30 A. Chambolle (Université de Paris IX, France)
Functions of bounded variation and numerical approximation of variational problems in image processing.

11:00-13:00 F. Guichard (INRETS LIVIC, Arcueil, France)
Image iterative smoothing and PDE's.

Computer demonstrations

14:30-15:30 B. Bourdin (Caltech, Pasadena, U.S.A.)
Functions of bounded variation and numerical approximation of variational problems in image processing. Group 1

15:30-16:30 B. Bourdin (Caltech, Pasadena, U.S.A.)
Functions of bounded variation and numerical approximation of variational problems in image processing. Group 2

16:30-17:30 L. Moisan (Ecole Normale Superieure de Cachan, France)
Image iterative smoothing and PDE's. Group 1

17:30-18:30 L. Moisan (Ecole Normale Superieure de Cachan, France)
Image iterative smoothing and PDE's. Group 2

Week 2 (11 - 15 September)

Monday, 11 September - Thursday, 14 September

Courses

8:30-10:30 Y. Meyer (Ecole Normale Superieure de Cachan, France)
Wavelets and functions with bounded variation from image processing to pure mathematics.

11:00-13:00 Song Chun Zhu (Ohio State University, Columbus, U.S.A.)
Statistical and computational theories of vision.

Computer demonstrations

14:30-15:30 M. Nahon (Yale University, New Haven, U.S.A.)
Wavelets and functions with bounded variation from image processing to pure mathematics. Group 1

15:30-16:30 M. Nahon (Yale University, New Haven, U.S.A.)
Wavelets and functions with bounded variation from image processing to pure mathematics. Group 2

16:30-17:30 Yingnian Wu (University of California, Los Angeles, U.S.A.)
Statistical and computational theories of vision. Group 1

17:30-18:30 Yingnian Wu (University of California, Los Angeles, U.S.A.)
Statistical and computational theories of vision. Group 2

Friday, 15 September

Courses

8:30-10:30 Y. Meyer (Ecole Normale Supérieure de Cachan, France)
Wavelets and functions with bounded variation from image processing to pure mathematics.

11:00-13:00 Song Chun Zhu (Ohio State University, Columbus, U.S.A.)
Statistical and computational theories of vision.

Week 3 (18 - 22 September)

During the third week there will be a **Conference.** Invited speakers will include:

M. Bertalmio (University of Minnesota, Minneapolis, U.S.A.)
A. Braides (SISSA, Trieste, Italy)
F. Cao (Ecole Normale Supérieure de Cachan, France)
S. Casadei (M.I.T., Cambridge, U.S.A.)
V. Caselles (Universitat Pompeu Fabra, Barcelona, Spain)
A. Chambolle (Université de Paris IX, France)
T. Chan (University of California, Los Angeles, U.S.A.)
A. Desolneux (Ecole Normale Supérieure de Cachan, France)
F. Dibos (Université de Paris IX, France)
P. Frosini (Università di Bologna, Italy)
Y. Gousseau (Ecole Normale Supérieure de Cachan, France)
F. Guichard (INRETS LIVIC, Arcueil, France)
P. Kornprobst (INRIA, Sophia Antipolis, France)
C. Mantegazza (Scuola Normale Superiore, Pisa, Italy)
R. March (Istituto per le Applicazioni del Calcolo, Roma, Italy)
Y. Meyer (Ecole Normale Supérieure de Cachan, France)
J.-M. Morel (Ecole Normale Supérieure de Cachan, France)
P. Monasse (Ecole Normale Supérieure de Cachan, France)
M. Nahon (Yale University, New Haven, U.S.A.)
S.J. Osher (University of California, Los Angeles, U.S.A.)
L. Rudin (Cognitech, Pasadena, U.S.A.)
J. Sethian (University of California, Berkeley, U.S.A.)
J. Shah (Northeastern University, Boston, U.S.A.)
S. Solimini (Università di Bari, Italy)
L. Vese (University of California, Los Angeles, U.S.A.)
Y. Wu (University of California, Los Angeles, U.S.A.)
S.-C. Zhu (Ohio State University, Columbus, U.S.A.)