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November 26th (Tues.)

9:00 - 9:30 Registration

9:30 - 10:00 Opening Session

Ishizaka, S. (Japan)
Institute of Biological Sciences, Univ. of Tsukuba

10:00 - 10:30 Interest in Forms in Japan and the West

Toda, M. (Japan)
Emeritus Prof., Tokyo Univ. Education

Pattern Formation and Morphogenesis I

Session 1. Fractal Phenomena

Chairperson: Toda, M. (Japan) and Sawada, Y. (Japan)

10:30 - 12:10 1) Patterns and Disorder in Fractal Growth Processes.

(Invited)
Sander, L. M. (U.S.A.)
University of Michigan

2) Directed Dendritic Fractals

Takayasu, H. and Nishikawa, I. (Japan)
Department of Physics, Faculty of Science, Kyoto University

3) Experimental Investigations on the Fractality and Kinetics of Aggregation

Matsushita, M., Hayakawa, Y., Sumida, K. and Sawada, Y. (Japan)
Res. Inst. Electr. Commun., Tohoku University

4) Diffusion-limited Aggregation with a Restriction of Growth Direction (Poster)

Kondo, H.,¹ Matsushita, M.¹ and Ohnishi, S.² (Japan)
Res. Inst. Electr. Commun., Tohoku University¹
Exploratory Lab., NEC Fundamental Research Labs.²

5) Dynamical Pattern-Formation in Temperature Barkhausen Effect (Poster)

Haseda, T. and Ozawa, S. (Japan)
Faculty of Engineering, Ibaraki University

12:10 - 13:30 Welcome Party

13:30 - 14:10 6) Application of Fractal Theory to Radiographic Screen-film graininess

Sumita, M.,¹ Ueda, S.,¹ Iwata, K.² and Hamada, N.² (Japan)
Kinki University Hospital¹, Nara Medical School²

7) Fractal Dimensions of Spatial Digital Noise by Scintillation Camera

Iwata, K.,¹ Hamada, N.,¹ Sumita, M.² and Ueda, S.² (Japan)
Nara Medical University¹, Kinki University, Osaka²

Session 2. Pattern in Systems of Active Elements

Chairperson: Mori, H. (Japan)

14:10 - 15:30 1) Growth Form of Snow Crystals

Kuroda, T. (Japan)
Institute of Low Temperature Science, Hokkaido University

2) Dynamical Pattern Formation of an Evaporating Drop

Takaki, R., Yoshiyasu, N., Arai, Y. and Adachi, K. (Japan)
Tokyo University of Agriculture and Technology
The University of Electro-communications

15:30 - 15:50 Coffee Break

- 15:50 - 18:00
- 3) Defect Motion in EHD Convective Cell Site with two free lateral Boundaries
Yamasaki, H.,¹ Kai, S.,² Ozato, Y.,³ and Hirakawa, K.³ (*Japan*)
Department of Electronics, Fukuoka Institute of Technology¹,
Department of Electrical Engineering, Kyushu Institute of Technology²
Department of Electronics, Kyushu University³
 - 4) Dynamics of Random Interfaces with a Nonzero Initial Order Parameter
Toyoki, H. and Honda, K. (*Japan*)
Nagoya University
 - 5) Subaxolemmal Microtubules in Squid Giant Axons under
Optical Microscope and Their Possible Physiological Role. (Poster)
Ichikawa, M.¹ and Matsumoto, G.² (*Japan*)
University of Tsukuba,¹ Electrotechnical Laboratory²
 - 6) Concept of Self-Similarity and Drainage Basin Morphology (Poster)
Tokunaga, E. (*Japan*)
Faculty of Economics, Chuo University
 - 7) A Stochastic Model of Branching Process of Trees (Poster)
Agu, M. and Yamanaka, K. (*Japan*)
Faculty of Engineering, Ibaraki University
 - 8) Hybrid Continuum-discrete Models for Solidification and Aggregation (*Invited*)
Packard, N. H. (*U.S.A.*)
Institute for Advanced Study
 - 9) Spatial-Temporal Patterns in Coupled Map Lattices
Kaneko, K. (*Japan*)
Institute of Physics, College of Arts and Sciences, University of Tokyo
 - 10) Phase Transitions in Two Dimensional Cellular Automata
Iba, Y., Akutsu, Y. and Kaneko, K. (*Japan*)
Institute of Physics, College of Arts and Sciences, University of Tokyo
 - 11) Cellular Automata and Chaos in N-Equivalent Switching Elements
Aoki, K. and Mugibayashi, N. (*Japan*)
Department of Electrical Engineering, Faculty of Engineering, Kobe University

November 27th (Wedn.)

Morphometry and Stereology I

Session 3. General Theory and Statistical Method

Chairperson: Higuti, I. (*Japan*) and Miles, R. E. (*Australia*)

- 9:00 - 10:40
- 1) On a Distance Between two Space Curves
Kishimoto, K. (*Japan*)
Faculty of Engineering, Hiroshima University
 - 2) Basic Paradigm in Stereology
Higuti, I. (*Japan*)
The Institute of Statistical Mathematics
 - 3) A New Chord Method to get Spherical Size Distribution
Baba, K.¹ and Miyamoto, K.² (*Japan*)
Department of Pathology and Surgical Pathology, School of Medicine,
University of Occupational and Environmental Health¹
Institute of Medical Sciences, Dokkyo University, School of Medicine²
 - 4) The Impact of Tandem Scanning Light Microscopy on Stereology
Howard, C. V. (*United Kingdom*)
Department of Anatomy, University of Liverpool

10:40 - 11:00 *Coffee Break*

- 11:00 - 12:30 5) Spatial Tesselations and their Stereology (Invited)
Miles, R. E. (Australia)
Department of Statistics, Institute of Advanced Studies,
Australian National University
- 6) On the Stereology of the Radial Distribution Function of hardcore Systems Tanemura, M. (Japan)
The Institute of Statistical Mathematics
- 7) Probabilistic Characterization of the inner order of Random Structure Koenig, D. (E. Germany)
Mining Academy of Freiberg, Dept. Mathematics

12:30 - 14:00 Lunch Break.

Session 4. Micromechanics of Inhomogeneous Materials

Chairperson: Beddow, J. K. (U.S.A.) and Satake, M. (Japan)

- 14:00 - 15:40 1) Stereological Approaches to Cementitious Composites (Invited)
Stroeven, P. (Netherlands)
Stevin Laboratory, Department of Civil Engineering
Delft University of Technology,
- 2) Evaluation of Crack Geometry in Rock Masses Oda, M. (Japan)
Saitama University
- 3) Compatibility Conditions for Granular Assembly Satake, M. (Japan)
Department of Civil Engineering, Tohoku University
- 4) Computer Simulation of Quasi-static Deformation of Granular Materials Kishino, Y. (Japan)
Tohoku University

15:40 - 16:00 Coffee Break.

Session 5. Morphological Analysis of Materials

Chairperson: Jinbo, G. (Japan) and Stroeven, P. (Netherlands)

- 16:00 - 18:00 1) Size Shape and Texture Analysis Beddow, J. K. (Invited)
Center for Particulate Material Processing Sciences,
Chemical & Materials Engineering, 1153 EB, University of Iowa, (U.S.A.)
- 2) Regeneration of Form by Fourier Technique and its Application in Powder Characterization Paramanand and Ramakrishnan, P. (India)
Department of Metallurgical Engineering Indian Institute of Technology
- 3) A Quantitative Analysis Method of Orientation for Fibrous Pattern Idesawa, M. and Soma, T. (Japan)
Riken: The Institute of Physical and Chemical Research
- 4) A Simplified Conversion Method of Contour Surface Model to Mesh Surface Model Cheng, K. (China) and Idesawa, M. (Japan)
Riken: The Institute of Physical and Chemical Research
- 5) Texture Analysis of Charpy Fracture Surfaces using a Digital Image Processing System Yanagisawa, M.¹ and Furukimi, O.² (Japan)
System Development/Kawatsesu System Development Corporation¹
Plate Lab./Kawasaki Steel Corporation²

November 28th (Thur.)

Pattern Recognition and Image Processing I

Session 6. Three-dimensional Shape Features and Image Understanding

Chairperson: Toussaint, G. T. (Canada) and Sugihara, K. (Japan)

- 9:10 - 10:30 1) Pattern of Annual Rings of Trees
Onoe, M. (Invited)
Institute of Industrial Science, University of Tokyo (Japan)
- 2) Three-dimensional Seismic Velocity Structure beneath South-West
Japan revealed by Geotomography
Hirahara, K. and Mikumo, T. (Japan)
Disaster Prevention Research Institute, Kyoto University
- 3) Structural Features of Three-dimensional Images
Watanabe, Y. (Japan)
Kanazawa Institute of Technology

10:30 - 10:50 Coffee Break.

- 10:50 - 11:50 4) Three-dimensional Object Recognition Using Moments
Hall, E. L. (U.S.A.)
University of Cincinnati (Invited)
- 5) A Vision System for Bin-picking Tasks guided by an Interpretation Tree from a CAD Model
Ikeuchi, K. (Japan)
Computer Vision Section, Electrotechnical Laboratory
- 6) Correspondence between Line Drawings of Polyhedrons and Plane Skeletal Structures (Poster)
Sugihara, K. (Japan)
Faculty of Engineering, Nagoya University

Session 7. Image Generation and Graphics

Chairperson: Hall, E. L. (U.S.A.) and Yokoi, S. (Japan)

- 11:50 - 12:30 1) Recursive Interpolation
Sato, M. (Japan)
Department of Computer Science, Tokyo Institute of Technology
- 2) 3-D Brain CT Image Display System for Planning of Cranio-facial Operation (Poster)
Yasuda, T., Yokoi, S. and Toriwaki, J. (Japan)
Department of Information Engineering, Faculty of Engineering, Nagoya University
- 3) Rugged Texture Generation by Stochastic Models (Poster)
Tsuruoka, S.,¹ Suzuki, N.,¹ Kimura, F.,¹ Yokoi, S.² and Miyake, Y.¹ (Japan)
Faculty of Engineering, Mie University¹
Faculty of Engineering, Nagoya University²
- 4) Stereographic Semitransparent Images Reconstructed by Computer Graphics from Serial Microscopic Sections
Sato, A. G.,¹ Yasuda, M.,¹ Nakamae, E.² and Sato, Y.² (Japan)
Hiroshima University School of Medicine¹,
Faculty of Engineering, Hiroshima University²
- 5) Computer Graphics of Diffraction Pattern For Determination of Micro-Sphere Spacing on Cell surface by means of Antigen-Antibody Reaction
Hayashi, T., Igarashi, F. and Ishizaka, S. (Japan)
Institute of Biological Sciences, Univ. of Tsukuba

12:30 - 13:30 Lunch Break.

Pattern Formation and Morphogenesis II

Session 8, Mechanism of Form and Pattern Creation in Living Systems I

Chairperson: Bernroider, G. (*Austria*) and Fujita, S. (*Japan*)

- 13:30 - 15:30
- 1) Molecular Configuration of Tubulins during Ciliogenesis
Hayashi, H. (*Japan*)
Animal Research Center, University of Occupational and Environmental Health, School of Medicine
 - 2) Patterns are universal restrictions in space-time, a theory exemplified by sexual neurogenesis and other biological processes
Bernroider, G. (*Invited*)
Zoological Institute of the University of Salzburg, (*Austria*)
 - 3) Growth descriptors for brain development
Eins, S. (*W. Germany*)
Zentrum Anatomie
 - 4) Synthetico-analytical approach to mechanism of shaping of the brain through simulation with computer graphics
Fujita, S. (*Japan*)
Department of Pathology, Kyoto Prefectural University of Medicine

* *Discussions*

15:30 - 16:00 *Coffee Break*

Session 9. Mechanisms of Form and Pattern Creation in Living Systems II

Chairperson: Kato, Y. (*Japan*) and Cowin, S. C. (*U.S.A.*)

- 16:00 - 18:00
- 1) Form Adaptation of Individual Biological Structures to Mechanical Stress
Cowin, S. C. (*U.S.A.*)
Department of Biomedical Engineering, Tulane University
 - 2) A Checkerboard-like Cellular Pattern due to Difference of Cell Affinities
Honda, H. and Yamanaka, H. (*Japan*)
 - 3) Morphogenesis and cell specification at embryonic stage; theoretical analysis
Doi, H. (*Japan*)
International Institute for Advanced Study of Social Information Science, FUJITSU LTD.
 - 4) Tooth Patterns; the arrangement and its formation
Horii, Z.¹ and Yamauchi, K.² (*Japan*)
Department of Oral Anatomy, Dental School of Okayama University¹
Department of Orthodontics, Dental School of Hiroshima University²
 - 5) Form and Force in Cell Division
(*Invited*)
Dan, K. (*Japan*)
Emeritus Prof., Tokyo Metropolitan Univ.

..... *Banquet*

November 29th (Fri.)

Pattern Recognition and Image Processing II

Session 10. Two-dimensional Shape Features and Textures

Chairperson: Kasvand, T. (Canada) and Toriwaki, J. (Japan)

- 9:10 - 10:40 1) Computational Geometry and Morphology
Toussaint, G. T. (Invited) (Canada)
School of Computer Science, MacGill University,
- 2) Spectral Analysis of Form based on Fourier Descriptors
Uesaka, Y. (Japan)
Department of Information Sciences, Faculty of Science and Engineering, Science University of Tokyo
- 3) Recognition of Shape and Transformation: An Invariant-Theoretical Foundation
Otsu, N. (Japan)
Electrotechnical Laboratory

10:40 - 11:00 *Coffee Break.*

- 11:00 - 12:00 4) Extraction of Lines of Unspecified Texture from Unconstrained Line Drawings
Kasvand, T. (Canada)
Division of Electrical Engineering, National Research Council of Canada
- 5) Adjacency Relations Among Figures on a digitized Image Plane with Applications to Texture Analysis
Yokoi, S. and Toriwaki, J. (Japan)
Department of Information Science, School of Engineering, Nagoya University
- 6) Two-Dimensional Auto-Regressive Model for Analysis and Synthesis of Gray Level Textures
Deguchi, K. (Japan)
Faculty of Engineering, Yamagata University

Session 11. Pattern Formation and Morphogenesis III (Posters)

Chairperson: Ogawa, T.

- 12:00 - 12:20 1) Structure of random cellular networks (Poster)
Rivier, N. (United Kingdom)
Blackett Laboratory, Imperial College
- 2) New Models of Synergetics Topology and Their Reciprocal All Space-Filling Transformations (Poster)
Kajikawa, Y. (Japan)
Design Science Institute, Hiroshima
- 3) Nonperiodic Tessellation with Eight-Fold Rotational Symmetry (Poster)
Watanabe, Y.,¹ Ito, M.¹, Soma, T.¹ and Betsumiya, T.² (Japan)
The Institute of Physical and Chemical Research¹
Unique Design Studio²
- 4) Three-Dimensional Penrose Transformation and the Ideal Quasicrystal (Poster)
Ogawa, T. (Japan)
Institute of Applied Physics, University of Tsukuba
- 5) Derivation of the Probability Density Function of Distance and Its Applications to Urban Facility Planning (Poster)
Koshizuka, T.¹ and Ohsawa, Y.²
Institute of Socio-Economic Planning, University of Tsukuba¹
Doctoral Degree Programs in Socio-Economic Planning, University of Tsukuba²

12:20 - 13:30 *Lunch Break.*

Morphometry and Stereology II

Session 12. The Form in Living Structures-Quantification and Functional Correlation

Introductory Lecture Chairperson: Ishizaka, S.

- 13:30 - 14:00 Introductory Lecture
 1) Supracellular Structural Principle of Multicellular Organism *(Invited)*
Suwa, N. *(Japan)*
Emeritus Prof., Tohoku University
- Chairperson: Togawa, T. *(Japan)*, Takahashi, T. *(Japan)* and Gundersen, H.J.G. *(Denmark)*
- 14:00 - 15:40 2) Stereology of Arbitrary Particles *(Invited)*
Gundersen, H. J. G. *(Denmark)*
Stereologic and Electron Microscopic Diabetes Research Laboratory, Institute of Pathology,
 and Second University Clinic of Internal Medicine, Aarhus University
- 3) Numerical Density Estimation of Curved and Sausage-shaped Particles from the Projection
 Image of Thick Section and Analysis of Mitochondria of Rat Liver
Miyamoto, K. and Yamaguchi, K. *(Japan)*
The Laboratory of Medical Sciences, Dokkyo University School of Medicine
- 4) Size Distribution Pattern of Thyroid Follicles and Langerhans Islets Correlated with their
 Hormone-Secreting Activity
Masuda, T. *(Japan)*
Department of Pathology, Tohoku University School of Medicine
- 5) The use of the convex hull and related transformations in macroscopic brain morphometry
Fukasawa, H. *(Japan)*
Department of Pathology, Research Institute for Brain and Blood Vessels-AKITA
- 15:40 - 16:00 *Coffee Break.*
 16:00 - 18:00 6) Diagnostic morphometry: new background to decisionmaking in diagnostic
 histopathology *(Invited)*
Collan, Y. *(Finland)*
Department of Pathology, Kuopio University
- 7) The 3-D Microstructure of Cancer and Its Topological Properties
Takahashi, T.¹ Iwata, N.² and Yaegashi, H.¹ *(Japan)*
Department of Pathology, The Research Institute for Tuberculosis and Cancer,
 Tohoku University¹
Department of Pathology, Saka General Hospital²
- 8) Difference of various mineral apposition rates in lameller bone formation (Poster)
Haba, T. and Takahashi, H. *(Japan)*
Department of Orthopaedic Surgery, Niigata University School of Medicine
- 9) Application of symbolic logic to the morphometric study of coronary diabetic
 microangiopathy (Poster)
Tasca, C., Vasilescu, C. and Cizmas, P. *(Romania)*
Faculty of Medicine
- 10) Color Image Analyzer and Its Application for Quantitative Morphology (Poster)
Takamatsu, T. and Fujita, S. *(Japan)*
Department of Pathology, Kyoto prefectural University of Medicine
- 11) Spherocyte-Echinocyte Reversible Transition and Some Physical
 Consequences of this Human Red Blood Cell Transformation (Poster)
Martino, R.,¹ Masiero, G.,¹ Bottecchia, D.¹ and Salvo, G.² *(Italy)*
Institute of Human Physiology-University of Padova,¹
"Istituto Superiore di Sanità" Rome²
- 12) Pictorial Derivation of Stereological Principles (Poster)
Baba, K. *(Japan)*
Department of Pathology and Surgical Pathology, School of Medicine,
 University of Occupational and Environmental Health

- 13) The Morphogenesis of Left Ventricular Hypertrophy of Heart as Correlated with the Muscle Fiber Architecture

Tezuka, F. (*Japan*)
Department of Pathology, Tohoku University Hospital

- 14) A consideration on geometrical similarity of the muscle of animals of different body dimensions in relation to physical work capacity

Togawa, T. (*Japan*)
Tokyo Medical and Dental University

November 30th (Sat.)

Session 13. Pattern Formation and Morphogenesis IV

Chairperson: Ogawa, T. (*Japan*)

- 9:10 - 13:00 1) New Optimality Theory in Nature

Niiseki, S. (*Japan*)
Dept. of Civil Engineering, Faculty of Engineering, Tohoku University

- 2) The Asymptotic Geometrical Structure of Geographically Optimized Configurations

Kawabata, T. (*Japan*)
The University of Electro-Communications

- 3) Golay Code for Leech Lattice and Random Packing

Ito, Y. (*Japan*)
The Institute of Statistical Mathematics

- 4) New Models of Synergetics Topology and their Reciprocal all-Space-filling Transformations

Kajikawa, Y. (*Japan*)
Design Science Institute, Hiroshima

- 5) A Trip in Julia Space (Video Film)

Hild, M. (*W. Germany*), Kohmura, M.
Kyoto College of Arts, Computer Graphics Department

- 6) Generalised Crystallography

(*Invited*)
Mackay, A. L. (*United Kingdom*)
Dept. of Crystallography, Birkbeck College, University of London

* Comments on Quasicrystals

Takeuchi, S., Kimura, K., Hiraga, K. and Hirabayashi, M. (*Japan*)

.....*Farewell Party*.....