

Contents

DIGITAL IMAGE GENERATION

Magnetic Resonance Imaging - MRI

Digital Imaging and its Impact on Radiology in Japan
(a new Concept of Image Save and Carry System: ISAC)
Shozo Hashimoto (J), Keynote Speaker 3

MR-Imaging of Stenotic Flow Phenomena - Experimental Studies
B. Krug, H. Kugel, G. Friedmann, R. Schmitt, H.J. Hirche (FRG) 9

Digital Subtraction Cisternography (DSC), CT Cisternography and MR Imaging
in Spinal and Paraspinal Cystic Lesions
A.K. Wakhloo, M. Schumacher, V. Van Velthoven, J. Hennig (FRG) 15

MR Receptor Imaging of the Liver
P. Reimer, R. Weissleder, A.S. Lee, J. Wittenberg, T.J. Brady (USA) 22

Considerations for the Unbiased In-Vivo Determination of the Volume and Surface Area
of Structures of Clinical Interest Using Magnetic Resonance Imaging
N. Roberts, V. Howard, M.W. Bourne, J. Salisbury, G.H. Whitehouse, R.H.T. Edwards (UK) 29

Hematopoietic Bone Marrow Hyperplasia of the Knee:
Use of Out-of-Phase Gradient-Echo MR Imaging
Ph. Lang, R. Fritz, S. Majumdar, H.K. Genant (USA) 36

Computer-Assisted Integration and Display of Diagnostic Features
in MR Spin Echo Multi Echo Sequences
S. Cagnoni, D. Caramella, E. Marin, G. Valli (I) 40

Phase Image Correction for Magnetic Resonance Chemical Shift Imaging
E.A. Castrén, J.A. Pohjonen (SF) 46

Digital Subtraction Angiography - DSA

3D Reconstruction of Vascular Structures from few X-Ray Projections
E. Klotz, P. Haaker, R. Koppe, R. Linde (FRG) 55

Digital Peripheral Angiography with Subtraction and Automated Stepping:
Comparison with other Techniques
T. Hilbertz, U. Fink, H. Berger, R. Beck, U. Eberwein (FRG) 62

Three-Dimensional Computerized Angiography
Y. Troussset, C. Picard, D. Saint-Felix, A. Rougee (F) 68

Experimental Validation of a Model for Blood Flow Measurement from DSA Images
R. Le Goff, P. Gerlot-Chiron, Y. Bizais (F) 73

Digital Radiography

Digital Luminescence Radiography in the Daily Routine <i>E. Voegeli (CH), G. Stumpf (FRG)</i>	81
Clinical Requirements for Computed Radiography Imagery Analysis <i>M.W. Hedgcock Jr., T.S. Levitt, V.M. Shadle (USA)</i>	88
Digital and Conventional Chest Radiographs: A Comparative Study on the Diagnosis of Interstitial Lung Disease <i>W. Dölken, A.E. Horwitz, Th. Krahe, P. Landwehr, K. Lackner (FRG)</i>	96
Examination of Swallowing Disorders using Digital Cine-Radiography (DCR) <i>K.F.R. Neufang, P. Siemens, B. Krug, W. Gross-Fengels, J. Gubitz, K. Ewen (FRG)</i>	102
Optimized Image Processing for Routine Digital Radiography <i>I. Maack, U. Neitzel (FRG)</i>	109
Radiography of the Chest - A Comparative Study of Analog and Digital Techniques <i>K.J. Lehmann, H.P. Busch, M.C. Freund, W. Jaschke, M. Georgi, K. Richter (FRG)</i>	115
Artefacts in Digital Storage Phosphor Radiography <i>J.W. Oestmann (NL), M. Prokop, C.M. Schaefer, M. Galanski (FRG)</i>	122
Digital Radiology Applied to the Study of the Oral Cavity by Orthopantomography <i>P. Burci, A. Pastremoli, C. Malagola, R. Stamati, M. Miceli, S. Sartoni Galloni, G. Guidarelli (I)</i>	127
Abdominal X-Ray Examinations - Conventional and Digital Techniques <i>B. Krug, K.F.R. Neufang, G. Friedmann, Th. Küpper (FRG)</i>	131
Observer Performance as a Function of Hardcopy Size <i>C.M. Schaefer, M. Prokop, J.W. Oestmann, S. Reichelt, B. Haubitz, W. Wiesmann, H.S. Stender, M. Galanski (FRG)</i>	138
Digital Storage Phosphor Radiography in Gastrointestinal Disease <i>C.M. Schaefer, M. Prokop, P. Reimer, M. Galanski (FRG), R. Greene, D. Hall (USA)</i>	143
Optimal Parameters for Unsharp Mask Filtering of Digital Chest Radiographs <i>M. Prokop, C.M. Schaefer, J.W. Oestmann, A. Meschede, S. Reichelt, M. Galanski (FRG)</i>	149

Ultrasound - US

Digital Interface for Selective Capture of Ultrasound Images <i>O. Ratib, A. Rosset, G. Trayser, R. Rivolet, J.F. Vurlo (CH)</i>	157
Ultrasonic Tissue Characterization of Myocardium using Texture Analysis of Echocardiographic Images <i>E. Lieback, R. Meyer, M. Nawrocki, R. Hetzer (FRG)</i>	162
Sonographic Volume Processing of Malignant Prostatic Lesions <i>D. Caramella, G. Braccini, L. Battolla, C. Bartolozzi, F. Cartei, O. Salvetti (I)</i>	166

Computer Tomography - CT

The Weighted Tchebycheff Norm Method for Multicriterion Image Reconstruction <i>Lu Weixue, Wang Yuanmei (PR China)</i>	173
Quantitative Dynamic CT of Malignant Liver Tumors <i>C. Zwicker, M. Langer, R. Langer, K. Rosenkranz, R. Felix (FRG)</i>	177
Quantitative Volumetric Assessment of Orbital Soft Tissue <i>F.W. Zonneveld, L. Koornneef, D. Wittebol-Post (NL)</i>	181
Colour-Coded 3D-Reconstruction of Abdominal Organs and Vessels <i>A.P. Wunderlich, M. Strotzer, J. Gmeinwieser, P. Gerhardt (FRG)</i>	187
A new Method for Assessing the Anchorage of Custom-Made Hip Endoprostheses with CT <i>R. Sokranski, E. Klotz, S. Klotz, D. Felsenberg, S. Exner (FRG)</i>	194
A Non-Stationary Markovian Modeling for the Lung Nodule Detection in CT <i>F. Preteux (F)</i>	199
Computed Tomography and 3-D-Surface Reconstructions of the Spine in Patients with Lower Back Pain <i>A. Kern, T. Wagnershauser, R. Felix (FRG)</i>	205
Degenerative Disc Disease and Volume Raytracing: A new Sophisticated Way to High Accuracy Computed Tomography in Patients with Low Back Pain <i>A. Kern, W. Krüger, R. Felix (FRG)</i>	207
Accuracy of Images and Measurements in 3D Bone Imaging <i>A. Pommert, W.-J. Hoeltje, N. Holzkecht, U. Tiede, K.H. Höhne (FRG)</i>	209
Colour Mapping of Tissue Perfusion Data Derived from Dynamic Computed Tomography <i>K.A. Miles, M.P. Hayball, A.K. Dixon (U.K.)</i>	216
Assessment of Bone Structure by Quantitative Computed Tomography <i>C.-C. Glüer, K.G. Faulkner, S. Grampp, P. Steiger, H.K. Genant (USA)</i>	220

Multimodality Imaging - MMI

3D Matching of Structural (CT, MR) and Functional (PET) Brain Image Data <i>Y. Huang, H. Steinmetz, U. Knorr, H. Herzog (FRG)</i>	229
Functional Diagnosis by Combining Biomagnetic Source Localization and Digital Images <i>J. Uebler, K. Abraham-Fuchs, M. Gebhardt, G. Röhrlein, S. Schneider (FRG)</i>	234
Fusion of Electromagnetic Source Data and Tomographic Image Data <i>P.A. van den Elsen, M.A. Viergever (NL)</i>	240

APPLICATION SYSTEMS

Computer Assisted Radiation Therapy - CART

Impact of Computer and Communication Technology on Radiology
and Related Disciplines

W. R. Hendee (USA), Keynote Speaker 249

Proposal of a Medical Knowledge System for Biological Radiotherapy Planning

G. Becker, M. Bamberg, W. Schlegel (FRG) see Appendix page.... 915

Automated Data Entry and Localisation of Interstitial Seed Implants in Brachytherapy

E. Claridge, E. Claridge (UK) 256

3D Therapy Planning for Interstitial Microwave Hyperthermia of Brain Tumors

M. Seebass, W. Schlegel, W.J. Lorenz (FRG) 263

A Survey of Algorithms for 3-Dimensional Electromagnetic Problems in Hyperthermia

P. Wust, J. Nadobny, R. Felix, M. Dohlus (FRG) 269

Computer Assisted Radiological Diagnosis - CARD

Knowledge Based Interpretation of Cranial MR Images

I.C. Carlsen, M. Imme, M.H. Kuhn, W. Menhardt, K. Ottenberg, K.-H. Schmidt (FRG) 277

Interpretation of Cranial MR-Images using a Digital Atlas of the Human Head

H.H. Zachmann (FRG) 283

A Multilayered Neural Network for the Recognition of Lung Nodules
on Digital Chest Radiographs

M.G. Penedo, D. Cabello, S. Barro, A. Mosquera, M.J. Carreira (E) 289

Characterisation of Benign Clustered Microcalcifications with a New Image Analysis Method

R. Gilles, F. Bouvet-Lefebvre, J. Masselot, E. Kahn (F) 295

Extraction and Measurement of Lesion Edge Blur in Mammograms
by Computer Image Analysis

J.H. Richter, E. Claridge (UK) 301

Automatic Identification of Probable Abnormal Scans
in Magnetic Resonance Imaging of the Head

N. Saeed, I.R. Young (UK) 308

NEURES, a Generalizable Approach to Computer Assisted Diagnosis
of CT Images with a Mixed Analytic and Connectivistic Model

G. Zöllner, A. Wackenheim, J.F. Rapp, L. Steib, B. Kastler (F) see Appendix page 891

Expert System Advice as a By-Product of Image Acquisition and Reporting:
Obstacles to be Overcome

P.G. Mutalik, P.R. Fisher, G.G. Weltin, H.A. Swett (USA) 315

Computer Assisted Orthopaedics - CAO

3-D Surface Detection and Pattern Recognition for Surgical Planning in Orthopaedics	
<i>Ä. Wallin (CH)</i>	323
Volume Based Object Manipulation for Simulation of Hip Joint Motion	
<i>B. Pflesser, U. Tiede, K.H. Höhne (FRG)</i>	329
Measuring the Accuracy of CT Bone Geometry for Orthopedic Implants	
<i>N.J. Mankovich, D.D. Robertson (USA), J. Essinger (CH)</i>	336

Computer Assisted Surgical Planning - CASP

Volumetric CT-Based Model Milling in Rehearsing Surgery	
<i>F.W. Zonneveld, M.F. Noorman van der Dussen, P.F.G.M. van Waes (NL), U. Kliegis (FRG)</i>	347
Transparent Liver Rendering Showing Metastases and Their Relation to Liver Veins for Optimizing Hepatic Surgery	
<i>L. Köhler, N. Rilling, A. Hewett, H. Niemann, P. Jensch (FRG)</i>	354
Indications for CAS (Computer Assisted Surgery) Systems as Navigation Aid in ENT-Surgery	
<i>L. Klimek, R. Mösges, M. Bartsch (FRG)</i>	358
Navigation Support for Surgery by Means of Optical Position Detection	
<i>W. Krybus, A. Knepper, L. Adams, R. Rüger, D. Meyer-Ebrecht (FRG)</i>	362
Diagnostic Imaging of Craniosynostosis	
<i>M.W. Vannier, B.S. Brunsden, J.L. Marsh (USA)</i>	367
The Integrated Display of CT, Angiograms and Intracranial EEG for Stereotactic Surgery Planning in Epilepsy	
<i>L. Lemieux, S. Lester, D. Fisch (UK)</i>	374

IMAGE MANAGEMENT AND COMMUNICATION

Picture Archiving & Communication Systems- PACS

PACS in Japan	
<i>Kiyonari Inamura (J), Invited Speaker</i>	383
Geneva PACS Project: A Hospital-wide Integrated System	
<i>O. Ratib, Y. Ligier, M. Funk, D. Hochstrasser, J.R. Scherrer (CH)</i>	391
PACS - Experiences and Future Developments	
<i>F. Astinet, M. Langer, A. Kern, W. Zendel, O. Guckelberger, R. Felix (FRG)</i>	398
Introduction of Digital Imaging Archiving System at John Hunter Hospital, Newcastle, Australia	
<i>B.L. Crowe, A. Perrignon (AUS)</i>	407
First Results of a Small PACS-Unit	
<i>U. Fink, B. Mayr, Th. Hilbertz, S. NissenMeyer, J. Weber, Ch. Gärtner, A. Will (FRG)</i>	414

Two Years Experience with a PACS-Entry-Level-System as a Basis for a Modular IMACS in Freiburg

B. Kohlberger, Ph. Vinée (FRG) 419

Film and PACS: Friends or Foes

G. Claeys, V. Wanchoo (B) 425

TMSTM, the Integrated Network Solution for Better Cancer Treatment

H. Dahlin, P. Ekström, B. Högstöm (S) 432

The Vienna SMZO-PACS-Project: The Totally Digital Hospital

W. Hruby, H. Mosser, M. Urban (A), W. Rüger (FRG) 436

A New Task in Radiology: The Radiology Information and Communication Coordinator

H. Mosser, M. Urban, W. Hruby (A) 442

Clinical Problems Associated with the Introduction of PACS

R. Friedenberg (USA), Invited Speaker 447
D. Katz, M. Joyce Pais (USA)

Are Hospital-wide PACS Implementations Possible now (soon)?

F.P. Ottes, A.R. Bakker, J.M.L. Kouwenberg (NL) 450

Strategies for the Progressive Introduction of PACS

A.F. Naylor (USA) 456

Servima: An Open PACS with a Distributed Image Data-Base and Display Server. Integrating a Mixed Workstation Environment by Software Standards

G. Zöllner, A. Wackenheim, J.F. Rapp, J.L. Dietemann (F) see Appendix page 911

Prefetching Offers Prospects for a Quick Responding PACS

B.M. van Poppel, H. Lodder, P.H. Elsackers, N.L. Koens, A.R. Bakker (NL) 464

A General Image File Format

D.A.G. Wicks, G.J. Barker, D.L. Plummer (UK) 471

Discrete X-Ray Transform Application in Compression of Digital Images

S.G. Zougbi (West Banks) 477

ImNet/2 Transmits Images at 140 Mbit/s

A. Keizers, D. Meyer-Ebrecht, F. Vossebürger (FRG), W.J.J. Stut (NL) 482

Expanding the Dimension of PACS

M. Herforth, W. Beier, B. Luetke (FRG) see Appendix page 905

Radiological Information System - RIS

Health Level Seven for Radiology Applications

S.W. Smith, M.E. Ebert (USA) 491

Modern RIS Design from a Radiologist's View

Ch. Gärtner, J. Weber, S. Nissen-Meyer, Th. Hilbertz, U. Fink (FRG) 496

HCI in Breast Cancer Screening

<i>A.G. Gale (UK)</i>	499
---------------------------------	-----

Data Bases - DBPACS Integration with Hospital Information Structures:
Requirements, Problems and Possible Solutions

<i>F. Prampolini (I)</i>	507
------------------------------------	-----

A Geometric Indexing Scheme for an Image Library

<i>H.D. Tagare, G.R. Gindi, J.S. Duncan, C.C. Jaffe (USA)</i>	513
---	-----

Graphical Tools and Retrieval Strategies for Medical Image Databases

<i>P. Kofakis, S. Orphanoudakis (GR)</i>	519
--	-----

Digital Image Management and Standards - ST

Standard Activities of Radiology in Japan

<i>Takahiro Kozuka MD (J)</i> , Invited Speaker	527
---	-----

Open System Characteristics

<i>R. Hindel PhD (USA)</i> , Invited Speaker	see Appendix page 897
--	----------------------------

MEDICAL WORKSTATIONS**Computer Graphics and Computer Vision - CG/CV**

Formation of Image Objects in Human Vision

<i>S.M. Pizer PhD (USA)</i> , Invited Speaker	535
<i>J. M. Coggins, C.A. Burbeck (USA)</i>	

Automated 3D MR Image Analysis with a Rule-Based Segmentation System

<i>H.-H. Ehrlicke (FRG)</i>	543
---------------------------------------	-----

Three-Dimensional Imaging of the Wrist

<i>L. Brunie, P. Cinquin, S. Miguet (F)</i>	549
---	-----

Estimating Partial Volume Induced Local Blurring of Organ Contours
in Computed Tomograms

<i>G. Gabrielides, H. Neumann, H.S. Stiehl (FRG)</i>	556
--	-----

Mathematical Morphology and Active Contour Model:

A Cooperative Approach for Segmentation of Lung Contours in CT

<i>F. Preteux (F), Y. Hel-Or (IL)</i>	563
---	-----

Symbolic Description of Complex 3D Objects from Medical Volume Data

<i>X. Cheng, G. Gerig (CH)</i>	569
--	-----

Multimodality Imaging with PET, MRI and CT

<i>R. Acharya (USA)</i>	575
-----------------------------------	-----

Computer Characterisation of Clustered Microcalcifications in Mammograms <i>F. Lefebvre, R. Gilles, J. Masselot, E. Kahn (F)</i>	582
Characterization of Vasculature in 3D Medical Images <i>K.P. Andriole, S.C. Orphanoudakis (GR)</i>	588
A Neural Network Approach to MR and CT Image Understanding <i>R. Poli, D. Caramella, M. Rucci, G. Valli (I)</i>	594
Segmentation and Recognition of MR Pathological Images <i>S. Dellepiane, G. Venturi, G. Vernazza (I)</i>	600
Segmentation of Dual-Echo MR Head Data <i>G. Gerig, O. Kübler (CH), J. Martin, R. Kikinis (USA)</i>	606
Segmentation System for Medical Images <i>O. Huttunen, O. Lipponen, T. Vehkomäki, T. Katila, X. Yu, J. Yla-Jääski (SF)</i>	612
A Knowledge-Based System for the Automatic Interpretation of X-Ray CT Scans <i>K. Natarajan, M.G. Cawley, J.A. Newell (UK)</i>	618
Digital Image Processing of X-Ray and MR Breast Images <i>S.L. Free, K. Straughan, R.I. Kitney, A.W. Goode, M.J. Turner, C. Panah (UK)</i>	624

Man Computer Interaction - MCI

A Rule-Based Model of Diagnostic Information Requirements for the Design of Adaptive Image Workstations <i>Th. Wendler, B. Wein (FRG)</i>	629
Scrolling Radiologic Images: Requirements, Designs, and Analyses <i>D.V. Beard, P. Brown, B.M. Hemminger, R. Misra (USA)</i>	636
Interactive User Interface for Visualizing Digital Medical Images <i>M. Funk, Y. Ligier, O. Ratib, R. Perrier, C. Girard (CH)</i>	642

Modelling - MOD

Automatic Generation of a Dynamic Anatomical Model for Use in Subsequent Radiological Image Interpretation <i>M.G. Cawley, K. Natarajan, J.A. Newell (UK)</i>	651
Modelling 3D Geometric Objects in the Extended Cell Enumeration Representation <i>U. Tronnier, F. Hasenbrink, A. Wittich (FRG)</i>	657
A 3D C ¹ Stereotactic Deformation Model to Merge Multimodality Images and Atlas Data <i>D. Lemoine, C. Barillot, B. Gibaud, E. Pasqualini (F)</i>	663
3-D Reconstruction, Modelling and Viewing of Coronary Vessels <i>A. Wahle, H. Oswald, G.-A. Schulze, J. Beier, E. Fleck (FRG)</i>	669
3D Modelling of Medical Imagery <i>K.D. Toennies (FRG)</i>	677

Design and Applications - DA

3-D Visualization and Analysis of Biomedical Images Using ANALYZE <i>R.A. Robb PhD (USA), Invited Speaker</i>	685
Radiologists Start Designing their Digital Workplace: Prototyping with a Digital Image Workstation in the Radiology <i>M. Dahm, K. Glaser, H. Jansen-Dittmer, A. Keizers, P. Krüger, D. MeyerEbrecht, K. MunkerKaupp, H. Rudolf, C. Schilling, R. Sieslack, W. Winkler, B. Wein, R. Günther (FRG)</i>	699
The MGI Workstation: An Interactive System for 3D Medical Graphics Applications <i>A.C. Tan, S.R. Richards, A.D. Linney (UK)</i>	705
Match Vox - A Workstation for Computer Assisted Neuroimaging <i>T. Schütz, H. Vogt, M. Gerke, H.J. Kretschmann (FRG)</i>	711
3D Surface Display of Blood Vessels by Postprocessing of MR Angiographic Data <i>F. Träber, B. Ostertun, A. Steudel, B. Siewert, W.A. Kaiser, M. Reiser (FRG) P. van Dijk, J. Gieseke (NL)</i>	716
Accuracy of Measurement in Quantitative Coronary Angiography (QCA) <i>J. Beier, H. Oswald, U. Sauer, E. Fleck (FRG)</i>	721
The Effect of Image Magnification and Context Reduction on Diagnostic Performance with a Digital Workstation <i>K. Glaser, B. Wein, B. Fasel (FRG)</i>	727
PACS Versus Hard Copy for Image Analysis - Evaluation of Time Effects and Diagnostic Accuracy (This object is included in "PACS - Experiences and Future Developments") <i>F. Astinet, M. Langer, A. Kern, W. Zendel, O. Guckelberger, R. Felix (FRG)</i>	733

SPECIAL SESSION ON SOCIAL ASPECTS

Social Implications

Medico/Legal Consequences of Digital Radiological Imaging <i>J.O.M.C. Craig MD (UK) Keynote Speaker</i>	737
Computer-Aided Diagnosis in Radiology <i>H.A. Swett MD (USA), Invited Speaker</i>	738
Clinical Experience with a PACS Serving the Medical Intensive Care Unit at the University of Pennsylvania <i>H.L. Kundel, S.B. Seshadri, R.L. Arenson (USA)</i>	744
Aspects of Clinical Organization and Operation Forms for 3D Treatment Planning <i>G. Gademann, J. Romahn, G. Becker, W. Schlegel, G. van Kaick, M. Wannenmacher (FRG)</i>	749
IMACS: Use in Clinical Case Demonstration and Teaching <i>E. List-Hellwig, R. Rechid, A. Ullrich, K.J. Klose (FRG)</i>	755

SPECIAL SESSION ON PEDIATRIC RADIOLOGY**Computer Assistance in Pediatric Radiology**

Computer Assisted Radiology for Infants and Children <i>Mutsuhisa Fujioaka (J)</i> , Invited Speaker	763
The Role of Computer Assisted Imaging in Paediatric Nuclear Medicine <i>D.L. Gilday (CDN)</i> , Invited Speaker	771
Computation of Tumor Burden in the Pediatric Patient <i>I.R. Greenshields, F. DiMario, G. Ramsby (USA)</i>	776
Digital Radiography (DR) in the Detection of Pediatric Hip Disorders <i>T. Hilbertz, U. Fink, T. Pfeifer, H. Schedel (FRG)</i>	782
Comparison of Digital with Film Screen Radiography in a Pediatric Emergency Room Setting <i>B. Shuckett, K. Mascola, P. Babyn, D. Manson, A. Daneman (CDN)</i>	787

SPECIAL SESSION ON TELERADIOLOGY**RACE/TELEMED**

Full-Scale Replacement of a Visiting Radiologist Service with Teleradiology <i>T. Sund, E. Rinde, J. Stirmer (N)</i>	793
Technical Suppositions Using Videoconference Systems in Medicine for Large Audience <i>W. Zendel, B. Erdmann, M. Langer, F. Astinet, R. Felix, U. Lemke (FRG)</i>	799
Videoconferencing in Medicine - Evaluation of Image Quality and Diagnostic Accuracy <i>F. Astinet, M. Langer, C. Zwicker, O. Guckelberger, R. Felix (FRG)</i>	803
Nuclear Medicine Image Distribution and Telecommunication through Public Broadband VBN <i>F. Bitter, R. Ochsenkühn, W.E. Adam, R. Knopp, H.-J. Biersack, P. Hieber, P. Müller (FRG)</i>	804
Functional Requirements on Teleradiology Systems <i>E. List-Hellwig, K.J. Klose, O. Rienhoff (FRG)</i>	811

POSTER SESSION

DIGITAL IMAGE GENERATION Magnetic Resonance Imaging

3D Projection Reconstruction: Implementation and Application to NMR Imaging <i>M. Staemmler, R. Brill, K. Gersonde (FRG)</i>	819
An Image Analysis Study on Brain Magnetic Resonance Imaging for Hepatic Encephalopathy <i>H.J. Syh, J.R. McConnell (USA)</i>	820
Fast MR Imaging of the Cervical Spine <i>P. Schubeus, B. Sander, W. Schörner, U. Tosch, R. Felix (FRG)</i>	821
Fast MR Imaging with Modified T2-Weighted Spin Echo Sequences <i>P. Schubeus, B. Sander, W. Schörner, M. Deimling, R. Felix (FRG)</i>	822
MR Imaging of the Wrist: 3-DFT Volume Acquisition with Multiplanar Reformatting <i>Ph. Lang, S. Grampp, M. Vahlensieck, S. Majumdar, H.K. Genant (USA)</i>	823
PINT: Pseudo-Inversion Null T2 Images to Enhance Contrast <i>R.J. Kurland, W.W. Woodruff Jr., G.R. Funkhouser, A.O. Jones (USA)</i>	see Appendix page 919

Nuclear Medicine

Applications of Deconvolution Algorithms and Smoothing Techniques to Renal Functional Images <i>I. Karagöz, E. Akata (TR)</i>	824
Radionuclide Cisternography, using SPECT and 3D Rendering <i>H. Henkes, G. Huber, J. Hierholzer, C. Kujat, T. Scherb, W. Becker, U. Piepgras (FRG)</i>	825

Computer Tomography

Intraarterial Dynamic CT as a Control of Tumor-Perfusion before Regional Chemotherapy in Lung, Breast and Liver Cancers <i>A. Rieber, H.-J. Brambs, J. Görich, G.W. Kauffmann (FRG)</i>	826
A Comparative CT Study using 2 Different Invasive Application Routes of Contrast Material in the Detection of Liver Metastases before Surgery <i>N. Rilling, H. Niemann, H.J. Illiger, H.J. Halbfass (FRG)</i>	827
Assessment of Acetabular Cup Orientation in Computed Tomography - A New Concept of Measuring Angles After Total Hip Replacement <i>D. Radtke, R. Sokiranski, S. Exner, M. Seidel, A. Radtke, R. Rahmzadeh (FRG)</i>	828
Three-Dimensional Imaging of Liver Masses <i>J. Gmeinwieser, A. Wunderlich, M. Strotzer, W. Bautz, P. Gerhardt (FRG)</i>	829
Three-Dimensional Reconstruction of Bone Structures <i>S. Delageniere, P. Grangeat (F)</i>	830
Volume Determination for Soft Tissue Organs or Lesions from CT Images <i>H. Fichte, W. A. Kalender (FRG)</i>	831

Lateral Dual X-Ray Absorptiometry of the Spine: Comparison to AP-DXA and QCT <i>Ph. Lang, P. Steiger, S. Schmitz, H.K. Genant (USA)</i>	832
A Spatial Limited Angle Model for Computerized Tomography <i>P.M. Salzberg (Puerto Rico)</i>	833
Geometry-Induced Errors in CT-Imaging <i>S. Alliney (I)</i>	834
Ultrasound	
Evaluation of Ultrasonic Statistical Parameters, Speckle Parameters and Attenuation in the Discrimination of Diffuse Liver Diseases <i>A.-B.M. Youssef, A.A.R. Sharawi, A.H. Sayed (ET)</i>	835
A Practical Approach in Modelling Ultrasound Linear-Array Image Generation <i>A.-B.M. Youssef, Y.M. Kadah (ET)</i>	836
Techniques for 3D Volume Imaging with Ultrasound <i>J.E. Gardener, W.R. Lees, A. Gillams, A.D. Linney, R. Richards, A.C. Tan (UK)</i>	837
A Neural Network for Ultrasound Image Lesion Recognition <i>X. Magnisalis, M.G. Strintzis (GR)</i>	see Appendix page 920
Digital Subtraction Angiography	
3-D Reconstruction of Coronary Network from Two and Three Projections: Results on Real Data <i>M. Garreau, C. Venaille, C. Chardenon, J.L. Coatrieux, R. Collorec (F)</i>	838
Non-Invasive Coronary Angiography with the System NIKOS II <i>W.-R. Dix, K. Engelke, W. Graeff, C. Hamm, J. Heuer, B. Kaempf, W. Kupper, M. Lohmann, B. Reime, R. Reumann (FRG)</i>	839
Digital Radiography	
Digital Radiography with Stimulable Phosphors; Clinical Use <i>F. Dhaenens, J.A. Verschaekelen, L. Van Fraeyhoven, G. Marchal, A.L. Baert (B)</i>	840
Computed Radiography (CR) System in the Remote X-Ray Department <i>E. Asai, H. Kato, M. Takano (J)</i>	841
Radiation Dose Requirements in Digital Image Intensifier Radiography (DIIR) <i>K.J. Lehmann, H.P. Busch, M. Georgi (FRG)</i>	842
Computer Assisted Arthrography after Hip Joint Replacement <i>B.K. Fink, U. Fink, M. Hansen, M. Pfahler, C.M. Kirsch (FRG)</i>	843
Recognition of Densities in Digital X-Ray Images <i>G. Braccini, D. Caramella, L. Battolla, R. Cioni, L. Bertellotti, O. Salvetti (I)</i>	844

Methods of Automatic Feature Extraction and Diagnostic Classification of the Heart in Digital Chest Radiographs

H. Gerst, K. Richter, H. Cobet (FRG) 845

A New Method for X-Ray Dose Reduction in Fluoroscopy

R. Freyer, K. Sliva, M. Weissig (FRG) 846

Multimodality Imaging

Primary-Information as Starting-Point for Digital and/or Analogous Processing by Imaging in Oncology

W. König, H. Grüner (FRG) 847

APPLICATION SYSTEM

Computer Assisted Radiation Therapy

Value of CT and MRI for Assessment of Tumor Volume and Technical Demands in Radiation Therapy

S. Sehlen, D. Matthaei, M. Busch, E. Dühmke (FRG) 848

Measurement Techniques in Photodynamic Therapy

R.H. Jindra (A) 849

A New Source Model for Linear Accelerators

E. Ihnen, J.M. Jensen (FRG) 850

CT and MR Based 3D Therapy Simulation

U. Tronnier, F. Hasenbrink, A. Wittich (FRG) 851

Computer Assisted Radiological Diagnosis

An Approach to Computer Aided Diagnosis in Breast Cancer Screening

A.G. Gale, G.E. Walker (UK) 852

Double-Contrast Examination of Gastrointestinal Tract: Application of Digital Processing

V. Cavallo, A. Fanucci, F. Giovagnorio (I) 853

Computer Assisted Orthopaedics

Realistic 3-D Views of Articular Surfaces and Soft Tissue

S. Stephenson, Fong Tsai (USA) 854

The Significance of Tc99m-Bone-Scintigraphy in Cementless Total Hip Arthroplasty and the Value in the Detection of Loosening

B. Grünert, L. Eckart, M. Gericke, H. Thierfelder, J. Pannhorst, R. Felix (FRG) 855

3-Phase-Scintigraphy with ^{99m}Tc-Labelled Nanocolloids in the Diagnosis of Postoperative Infections

B. Grünert, L. Eckart, M. Gericke, H. Thierfelder, J. Pannhorst, R. Felix (FRG) 856

Computer Assisted Cardiology

A Comparison between Digital Cardiac Imaging Measured Cardiac Output and the Fick Method of Cardiac Output Estimation for Patients with Coronary Artery Disease <i>W. Benzer, W. Metzler, P. Reinisch (A), A. Bakker (NL)</i>	857
Epipolar Relation to 3D Reconstruction of Coronary Arteries from Biplane X-Ray Angiograms <i>Y. Bao, H. Oswald, A. Wahle, E. Fleck (FRG)</i>	858
Cardiovascular Angiography on a Macintosh IIfx <i>E. Gronenschild, R. Groothedde, J. Janssen (NL)</i>	859

Computer Assisted Neurology

3D Reconstruction of Neurofunctional Systems of the Human Brain <i>H. Vogt, T. Schütz, M. Gerke, P. Beigel, C. Buhmann, A. Riedel, M. WahlerLück, H.-J. Kretschmann (FRG)</i>	860
--	-----

Computer Assisted Surgical Planning

Computer Assisted Localizer for Pre- and Intraoperative Planning of Surgery and Intraoperative Orientation <i>G. Laborde, J.M. Gilsbach, A. Harders, R. Mösges, G. Schlöndorff, A. Nachtsheim, L. Klimek, R. Rüger, D. Meyer-Ebrecht (FRG)</i>	861
---	-----

**IMAGE MANAGEMENT AND COMMUNICATION
Picture Archiving and Communication Systems**

Comparison between Conventional Radiography, Digital Radiography on Hard Copy and on PACS Display Workstation in the Detection of Pulmonary Nodules <i>M. Miceli, P. Burci, R. Stamati, M. Lipparini, S. Sartoni Galloni (I)</i>	862
An Intelligent Software Process for the Survey, Management and Error Detection in a PACS <i>M. Wiltgen, G. Gell (A)</i>	863

Radiological Information System

Ad Hoc Reporting in Radiology Applications <i>M.E. Ebert (USA)</i>	864
Experiences with the new MediRIS from the Informatics Point of View <i>S. Nissen-Meyer, J. Weber, Ch. Gärtner, U. Fink, Th. Hilbertz (FRG)</i>	865
Optimal User Interface for a RIS by using Modern Input Devices <i>J. Weber, Ch. Gärtner, S. Nissen-Meyer, U. Fink, Th. Hilbertz (FRG)</i>	866
Patient Management System for Scheduling, Billing, and Account Collections <i>D. Macken, P. Marx, W.V. Glenn Jr. (USA)</i>	867

Data Bases

Functional Medical Imagery Database Development

M.W. Hedgcock Jr., W. Karshat, S. Smith, T.S. Levitt (USA) 868

PACS Concepts using ISDN

A. Hewett, L. Köhler, N. Rilling, J. Schwanke, H. Niemann, P. Jensch (FRG) 869

MEDICAL WORKSTATIONS

Computer Graphics/Computer Vision

Combining 3-D Processing and Ray Tracing

C. Hamitouche, J.L. Dillenseger, A. Bruno, J.L. Coatrieux (F) 870

Texture Analysis of Cranial MR Images

P.J. Elliott, D.J. Prendergast (UK) 871

Segmenting Cranial MR Images using Edge-Region Integration

G. Brelstaff, P.J. Elliott, M. Ibison, J.M. Knapman (UK) 872

Comparison of Different 3D Reconstruction and Classification Algorithms Based on the Extended Cell Enumeration Representation

U. Tronnier, F. Hasenbrink, A. Wittich (FRG) 873

A New 3D Algorithm

V. Panichelli, L. Simili (I) 874

Systems Design and Applications

Streamlined Design of a Radiology Workstation for Clinical Applications

A. Gamboa-Aldeco, L.L. Fellingham, Ch.G. Ullrich (USA) 875

A First Approach to a Hyper-Media Radiological Workstation

M. Henke, G. von Voigt (FRG) 876

Information in Magnetic Resonance Images: The Parameterisation of Signal, Contrast and Noise

K. Straughan, J.P. Bean, A.M. Jennings, R.I. Kitney, A.J. Lunt (UK) 877

Development of an Integrated Diagnostic Workstation for the Display and Analysis of Multi-Modal Medical Images

K. Straughan, R.I. Kitney, D.W. Boyce, S.L. Free, J.P. Bean (UK) 878

Unified Medical Workstation: Concept, Tools and Realization

G.-A. Schulze, H. Oswald, A. Wahle, E. Fleck (FRG) 879

An Application of PC-Based Digital Image Processing in Computer Assisted Radiology

I. Bajla, I. Holländer, P. Latta, S. Matej, A. Pisár, M. Srámek (CSFR) 880

3 Dimensional Imaging of the Biliary Tree in Malignant Obstructive Jaundice

W.R. Lees, A. Gillams, J.E. Gardener, R. Richards, A.C. Tan, A.D. Linney (UK) 881

Social Implications

Design of a Cost-Effectiveness Analysis Study in Teleradiology

M. Gerneth, F.-R. Bartsch, M. Brado, R. Schosser (FRG) 882

Quality Assurance of Radiologic Examinations in Large Multicenter Study Settings

C.-C. Glüer, K.G. Faulkner, J.D. Rosin, M. Estilo, H.K. Genant (USA) 883

Teleradiology

Techniques for Teleradiology

T. Sund, E. Rinde, F. Kileng, J. Stirmer (N) 884

Historical Efforts Concerning Videoconferences

W. Zendel, R. Felix (FRG) 885

First Experience of Teleradiology Applied to Neurosurgical Patients

P. Burci, R. Stamati, M. Miceli, G.F. Cristi, M. Burzi, S. Sartoni Galloni (I) 886

Tele-Radiology System for ISDN Networks

P. Marx, R. Kemper, D. Macken, W.V. Glenn Jr. (USA) 887

APPENDIX

NEURES, a Generalizable Approach to Computer Assisted Diagnosis of CT-Images with a Mixed Analytic and Connectivistic Model

G. Zöllner, A. Wackenheim, J.F. Rapp, L. Steib, B. Kastler (F) 891

Open System Characteristics

R. Hindel PhD (USA), Invited Speaker 897

Expanding the Dimension of PACS

M. Herforth, W. Beier, B. Luetke (FRG) 905

Servima: An Open PACS with a Distributed Image Data-Base and Display Server. Integrating a Mixed Workstation Environment by Software Standards

G. Zöllner, A. Wackenheim, J.F. Rapp, J.L. Dietemann (F) 911

Proposal of a Medical Knowledge System for Biological Radiotherapy Planning

G. Becker, M. Bamberg, W. Schlegel (FRG) 915

PINT: Pseudo-Inversion Null T2 Images to Enhance Contrast

R.J. Kurland, W.W. Woodruff Jr., G.R. Funkhouser, A.O. Jones (USA) 919

A Neural Network for Ultrasound Image Lesion Recognition

X. Magnisalis, M.G. Srintzis (GR) 920

GLOSSARY 921

LIST OF AUTHORS 929