

GraphicCon'2004

14th International Conference of
Computer Graphics and Vision
Moscow State University
September 6-10, 2004

Final Program



Программа конференции

14-я Международная Конференция по
Компьютерной Графике и Зрению
Московский Государственный Университет
6-10 сентября 2004 года

Dear Participant,

We would like to welcome you to the GraphiCon'2004, which is the largest international conference on Computer Graphics between Europe and Asia annually organized in Russian Federation. Following well-established traditions, the 14th event is hosted by Moscow State University on September 6-10, 2004.

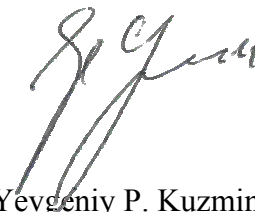
The conference is dedicated to the 250th Anniversary of Moscow State University. The university was established in 1755 and currently is one of the leading universities in Russia and worldwide. Its computer graphics laboratories based on the Department of Computational Mathematics and Cybernetics and on the Department of Mathematics and Mechanics are well recognized all over the world.

This year we have a great program comprising Technical Papers divided into two categories (full and short papers), State-of-the-Art Reports, Industrial Presentations and Animation Film Festival. Invited talk on Virtual Humans will be given by Prof. Martin Reiser from Fraunhofer Institute for Media Communication.

The International Program Committee was formed of 33 members representing 10 countries all over the world. Being top experts in the respective areas, all of them have done a tremendous job reviewing on average 3-4 papers out of 39 submitted at full format. Thus, the final decision was based on at least 3 reviews of each manuscript and ended up with 19 works selected for publications in the format of full technical paper. Some of the remaining papers were recommended for publication in a short form after revising. The final program included 39 short papers and work-in-progress reports.

We are very glad to notice that the conference continues to keep its international status as we have many great contributions from graphics communities all over the world. Taking this opportunity, we would like to thank all of the authors who contributed to the conference, since without them the event would not be possible.

We do hope you will enjoy the conference,



Dr. Yevgeniy P. Kuzmin
IPC Co-Chair

Conference At-a-Glance

Monday, September 6
Section A Section B

Tuesday, September 7
Section A Section B

Wednesday, September 8
Section A Section B

8:30	Registration						8:30
9:00							9:00
9:30	Opening Ceremony		Full Papers 1	Full Papers 2	Full Papers 4	Short Papers 5 (ru)	9:30
10:00			Full Papers 5	Short Papers 6 (ru)	10:00		
10:30	Invited Talk 1		Coffee Break				10:30
11:00			Coffee Break				11:00
11:30	Coffee Break		Full Papers 3	Full Papers 1 (ru)	Short Papers 5	Short Papers 7 (ru)	11:30
12:00			Short Papers 5	Short Papers 7 (ru)	12:00		
12:30	Invited Talk 2		Lunch Animation Film Festival		Lunch		12:30
13:00							Short Papers 8 (ru)
13:30	Lunch Animation Film Festival						13:30
14:00	STAR Report 1		STAR Report 2		STAR Report 3		14:00
14:30							14:30
15:00	Coffee Break		Coffee Break		Closing Ceremony		15:00
15:30	Short Papers 1 Short Papers 1 (ru)		Short Papers 3	Short Papers 4 (ru)			15:30
16:00			Short Papers 2 Short Papers 2 (ru)	Short Papers 4			Short Papers 3 (ru)
16:30	Short Papers 2 Short Papers 2 (ru)		Short Papers 4 Short Papers 3 (ru)				16:30
17:00							17:00
17:30							17:30
18:00							18:00
18:30			Social Event				18:30

Monday, September 6

10⁰⁰-10³⁰ **Opening Ceremony**

10³⁰-11³⁰ **Invited Talk 1: Virtual Humans**

Prof. Martin Reiser

Fraunhofer Institute for Media Communication, Sankt Augustin, Germany

Computer graphics is now at the point, where photorealistic virtual humans are possible and used in movies, in computer games, in TV and more and more as avatars in the Web and interfaces to novel applications. We present a survey of the research issues and of the application areas of this exciting new research field.

12⁰⁰-13⁰⁰ **Invited Talk 2: Current situation with real videoconferencing over the Internet**

Dr. Dmitry Vatolin

Visicron Corp., USA

We will show the following main technologies which allow videoconferencing over real Internet:

- 1. Videocoding, optimized for conference “talking heads” and floating channels*
- 2. Audio technologies (Noise generation, voice activity detection, echo suppression and echo cancellation.*
- 3. Transport technologies (working with NAT, SOCKs, Proxy, firewalls)*
- 4. Server side technologies (clustering, multi-protocol support, servers architecture)*

Presentation includes the following demonstrations:

- Videoconference in a university LAN (very good channel)*
- Videoconference through the server at a Moscow provider's site (good channel)*
- Videoconference through the server in USA (unpredictable channel)*
- Multiparty conference*
- Presentation through videoconference*
- Video broadcasting*

14⁰⁰-15⁰⁰ **STAR Report 1: Virtual environment visualization system for the tasks of space exploration: Current status**

Aleshin A., Afanasiev V., Baygozin D., Baturin Y., Bugaev A., Burlakov S., Goebel M., Dolgovesov B., Zhirnov A., Klimenko S., Mikhayluk M., Nikitin I., Nikitina L., Reiser M., Slobodyuk E.

VE Group of Institute of Computing for Physics and Technology

15³⁰-16³⁰

SP1: Computer Vision

Chair – S. Klimenko

1. Photogrammetric System for Frontal Face Image Acquisition

*Knyaz V.A.
State Research Institute of Aviation
System*

2. Face Recognition based on Curvature Estimation and Neural Networks

*Al-Akkad M.A.
Izhevsk State Technical University*

3. Reconstruction of projective and metric cameras for image triplets

*Khropov A. *, Shokurov A. *,
Lempitskiy V. *, Ivanov D. **
*Moscow State University
** RL Labs Joint Stock Company*

4. Optical Flow Invariants in Models of Driver's Visual Perception

*Eremin V.M., Koltyapin M.V.
Moscow State Industrial University*

16³⁰-17³⁰

SP2: Visualization and Rendering

Chair - S. Klimenko

1. Context-Aided Visualization of Volumetric Data

*Vassiliev V. *, Voloboy A. **,
Vyukova N. ***
*Fractal Technologies
**Keldysh Institute of Applied
Mathematics RAS
***Research Institute for System Studies
RAS*

2. GPU-Based Texture Flow Visualization

*Potiy O.A., Anikanov A.A.
Rostov State University*

3. A Real-Time 3D Rendering System with BRDF Materials and Natural Lighting

*Ignatenko A. *, Valiev I. **, Dmitriev K. **,
Barladian B. **, Ershov S. **,
Voloboy A. **, Galaktionov V. **
*Moscow State University, **Keldysh
Institute for Applied Mathematics,
RAS*

SPR1: Computer Vision 1

Chair – L. Mestetsky

1. Using of sub pixel line extraction methods in non-contact measure systems

*Pozin A.
State Research Institute of Aviation
Systems*

2. Tracking feature points in defocused video

*Lisitsin E., Konushin A., Vejnevets V.
Moscow State University*

SPR2: Computer Vision 2

Chair - L. Mestetsky

1. Algorithm for automatic segmentation of raster images based on growing of clusters for R-value maximums

*Minchenkov M.V.
Moscow Institute of Physics and
Technology*

2. Adaptive algorithm for satellite images transformations with discontinuities and partial data losses into geographical projections with partial errors correction

*Nepomnyaschy P.V.
Moscow Institute of Physics and
Technology*

3. Hierarchical agglomerative clusterization algorithm for image region selection

*Vovk O.L.
Donetsk National Technical
University*

9⁰⁰-10³⁰

FP1: Image Processing

Chair – L. Levkovich-Maslyuk

- 1. A Bayesian Framework for Recognizing Textured Objects in a Content-Based Image Retrieval System**
Eruhimov V., Lyashko M., Martinova E., Molinov S.
Intel Russia Research Center
- 2. An Improved Demosaicing Algorithm**
Lukin A., Kubasov D.
State University of Moscow
- 3. Image Compression Based on LDPC Codes**
Belogolovyi A.
Saint-Petersburg State University of Aerospace Instrumentation

FP2: Animation Simulation

Chair – Ye. Kuzmin

- 1. Non-Photorealistic Rendering of Hair for Animated Cartoons**
Côté M., Jodoin P., Donohue C., Ostromoukhov V.
Universit'e de Montr'eal
- 2. Real-time rendering of shallow water**
Belyaev V.
St. Petersburg State Polytechnical University
- 3. Interactive Design of Postures for Articulated Character Dancing Animation**
Chen C., Li C., Hu B.
Institute of Automation, Chinese Academy of Science

11⁰⁰-12³⁰

FP3: Geometry modeling 1

Chair – V. Ostromoukhov

- 1. A Low Cost Antialiased Space Filled Voxelization Of Polygonal Objects**
Thon S., Gesquière G., Raffin R.
University of Provence
- 2. Improvement of Triangular and Quadrilateral Surface Meshes**
Semenova I.B., Savchenko V.V., Hagiwara I.
Tokyo Institute of Technology
- 3. A priori computation of the number of surface subdivision levels**
Lanquetin S., Neveu M.
Université de Bourgogne

FPR1: Full Papers in Russian

Chair – D. Yurin

- 1. Accuracy Estimation of the Factorization Based 3D Recovery Algorithms**
Sveshnikova N.V., Yurin D.V.
Moscow Institute of Physics and Technology
- 2. Image shape comparison based at circular decomposition**
Mestetskiy L., Semenov A.
Tver State University
- 3. Practical model of dynamic atmosphere effects in the scope of visualization of open spaces in real-time**
Elykov N.A., Belago I.V., Kozlov S.M., Kuzikovskiy S.A., Lavrentev M.M.
IAE SD RAS
- 4. Construction of dynamic shadows in real-time visualization systems**
Kozlov S., Belago I.V., Elykov N.A., Kuzikovskiy S.A., Lavrentev M.M.
IAE SD RAS

14⁰⁰-15⁰⁰ **STAR Report: Application of Radial Basis Functions for CAD and CG**

Savchenko V.

Hosei University

15³⁰-16³⁰ **SP3: Image and Data Processing**

Chair – A. Krylov

1. Edge Detection Method by Tikhonov Regularization

Tsibanov V.N., Denisov A.M.,

Krylov A.S.

Moscow State University

2. Hermite Foveation

Krylov A., Kortchagine D.

Moscow State University

3. Hardware image filtering on desktop computers

Press J.

University of Tartu

4. A New Low Complexity Entropy Coding Method

Brailovsky I. , Kravtsunov E.** ,*

*Plotkin D.**

**The Institute of Microprocessor Computer Systems*

***Moscow State University*

SPR4: Image and Video Compression

Chair – V. Knyaz

1. High-quality video deblocking method without use of quantization parameters

Vatolin D., Grishin S.

Moscow State University

2. Backward classification of wavelet coefficients for image compression

Glavnov V., Krapivenko A.

Moscow Aviation Institute

3. Efficient lossless video compression method

Vatolin D., Popov D.

Moscow State University

16³⁰-17³⁰ **SP4: 3D Data Processing and Simulation**

Chair – A. Krylov

1. Realtime Simulation and Rendering of Dynamic and Complex Fracture Phenomena

Bao Z. , Karpov A.***

**Stanford University, **Ivanovo State University*

2. A Method for Repairing Triangulations

Emelyanov A., Skala V

University of West Bohemia

3. VirSculpt: a virtual sculpting environment

Raffin R., Gesquière G., Remy E., Thon S.

University of Provence

SPR3: Animation and Rendering

Chair – V. Knyaz

1. Rational description of Animated Character Motion in 3D-graphic Systems

Tyutin V.

Nizhniy Novgorod State University

18⁰⁰: **Social Event**

9⁰⁰-10⁰⁰ **FP4: Geometry modeling 2**
Chair – V. Savchenko

- 1. Intrinsic point cloud simplification**
Moening C., Dodgson N.A.
University of Cambridge
- 2. Topology-driven Progressive Mesh Construction for Hardware-Accelerated Rendering**
Turchyn P., Korotov S.
University of Jyvaskyla

9⁰⁰-10⁰⁰ **SPR5: CG Algorithms and Programming Techniques**
Chair – A. Pereberin

- 1. Delaunay triangulation: Recursion without spatial separation**
Mestetskiy L., Tsarik E.
Tver State University
- 2. Programming modern GPUs utilizing general languages of .NET platform**
Berezin S., Kalugin K., Karpushina E., Nevskiy E., Nosov K., Pavlova O.
Moscow State University
- 3. Review of robust techniques of model parameters estimation based on random sampling**
Marinichev K., Konushin A., Vejnevets V.
Moscow State University

10⁰⁰-11⁰⁰ **FP5: Motion Processing**
Chair – V. Savchenko

- 1. Biomechanical analysis and visualization tool of human morphological and motion data**
Aranov V.Y., Sholukha V.A., Van Sint Jan S.
St.Petersburg State Technical University
- 2. Building Performance Visualization using Augmented Reality**
*Malkawi A. *, Srinivasan R.***
**Department of Architecture, School of Design*
***University of Pennsylvania*

10⁰⁰-11⁰⁰ **SPR6: CAD Technologies**
Chair – A. Pereberin

- 1. Perturbation Functions in Geometric Modeling**
Vyatkin S.I., Dolgovesov B.S.
IAE SD RAS
- 2. Insolation duration calculating by means of 3D-modelling program AutoCAD**
Kheyfets A.L.
South-Ural State University
- 3. Conceptual geometric models**
Yermilov V., Kharin V., Shalak M.
Izhevsk State Technical University

11³⁰-12³⁰ **SP5: CAD Techniques**
Chair – D. Vatolin

- 1. Addressing 3D pointing anisotropy in Virtual Reality CAD application**
*Fiorentino M., Monno G.,
Uva A.E.*
Dipartimento di Disegno Tecnico Industriale e della Rappresentazione Politecnico di Bari
- 2. STEP-Compliant Application Framework for Virtual Prototyping**
*Semenov V., Alekseeva E.,
Morozov S., Tarlapan O.*
Institute for System Programming of the Russian Academy of Sciences

11³⁰-12³⁰ **SPR7: Computer Graphics in IMM UD RAS, Chair – V. Averbuh**

- 1. System for interactive visualization of parallel computations**
*Averbuh V.L., Vasev P.A.,
Gorbachevskiy D.U.,
Kazantsev A.U., Manakov D.V.*
IMM UD RAS
- 2. Utilizing 3D Visualization Methophors**
*Averbuh V.L., Baydalin A.U.,
Ismagilov D.R., Kazantsev A.U.,
Timoshpolskiy S.P.*
IMM UD RAS
- 3. Specialized system for visualization of some problems of optimal control**
*Moshkov A.V., Pahotinskih V.U.,
Reshetnyak V.O.*
IMM UD RAS
- 4. Languages for mapping types description for computer visualization systems**
*Averbuh V.L., Barakovskih N.I.,
Zenkov A.I., Petrov A.N.*
IMM UD RAS

12³⁰-13³⁰ **SPR8: CG in Education**
Chair – V. Averbuh

- 1. Generation of interactive learning courses based on modern technologies of virtual environments and Internet**
Dolgovosov B.S., Shemtsov M.U., Jmulevskaya D.R.
Yugra Research Institute of Informational Technologies, IAE
- 2. Computer graphics in the teaching process of Pereslavl University**
Khachumov V.
Institute of Programming Systems, Pereslavl University

14⁰⁰-15⁰⁰ **STAR Report: On viewpoint complexity of 3D scenes**
*Plemenos D. *, Sbert M. **, Feixas M. ***

**University of Limoges, **Institut d'Informatica i Aplicacions, Universitat de Girona*

13⁰⁰-17⁰⁰

"2-1/2D" Portrait Creation

Prof. Douglas C. Acheson

Computer Graphics Technology

Purdue School of Engineering and Technology at Indianapolis

This tutorial will give participants the opportunity to utilize the 3D NURBS modeling program Rhinoceros (Rhino) to create unique, stylized portraits without the need for complex surface modeling knowledge. Digital pictures of the participants will be used as background images within Rhino to extract unique facial characteristics in the form of closed splines. Extruded and altered in elevation, the facial features will be accentuated by textures, lighting and camera angles. Initial acquisition of the background images will also be discussed as well as the use of Photoshop to produce high-contrast images for tracing. This tutorial will illustrate how 3D modeling programs can be used as an artist's tool to inspire creative expression beyond that of traditional engineering applications.

This workshop will be taught at the introductory level. No prior knowledge of Rhino or Photoshop is required.

Biography:

Doug Acheson is an Associate Professor and Director of Computer Graphics Technology at the Purdue School of Engineering and Technology at Indianapolis, Indiana. He received an A.S. in Industrial Illustration, a B.S. in Technical Graphics, and a M.S. in Instructional Computing from Purdue University. His research interests include the generation, implementation, and downstream applications of graphical 3D databases. He is a member of American Society of Engineering Educators / Engineering Design Graphics division (ASEE/EDG), Assoc. of Computing Machinery / Special Interest Group Graphics (ACM-SIGGRAPH), Association for the Advancement of Computing Education (AACE), AutoCAD Users Group International (AUGI), and the Indianapolis Indiana 3D Studio Users Group. Professor Acheson also serves as Technical Advisor for the Institute for Affordable Transportation, a non-profit organization that designs and integrates Basic Utility Vehicles (BUV's) into rural areas of developing countries. www.drivebuv.org

Schedule of coffee and lunch breaks are up to the tutorial organizers.

Friday, September 10

13⁰⁰-17⁰⁰ **Object Oriented Multimedia Representation**

Dr. Dmitry Vatolin, Alexander Zhirkov

Graphics and Media Lab, CMC, Moscow State University, Moscow, Russia

Participants of this tutorial will be instructed in the theoretical foundations and practical methods of modern media data representation. For video data object oriented approach (OOA) actively used in last extensions of MPEG-4 video format and in applications of H.264. OOA will be discussed in the following areas: videoconferencing, multi-layered and other 3D video representations, modern image compression formats, model-based audio coding, including so-called hybrid coder and MPEG-4 structural audio format. Summarizing comparison between OOA and uniform representations will be performed.

Biographies:

Dmitriy Vatolin, Ph.D

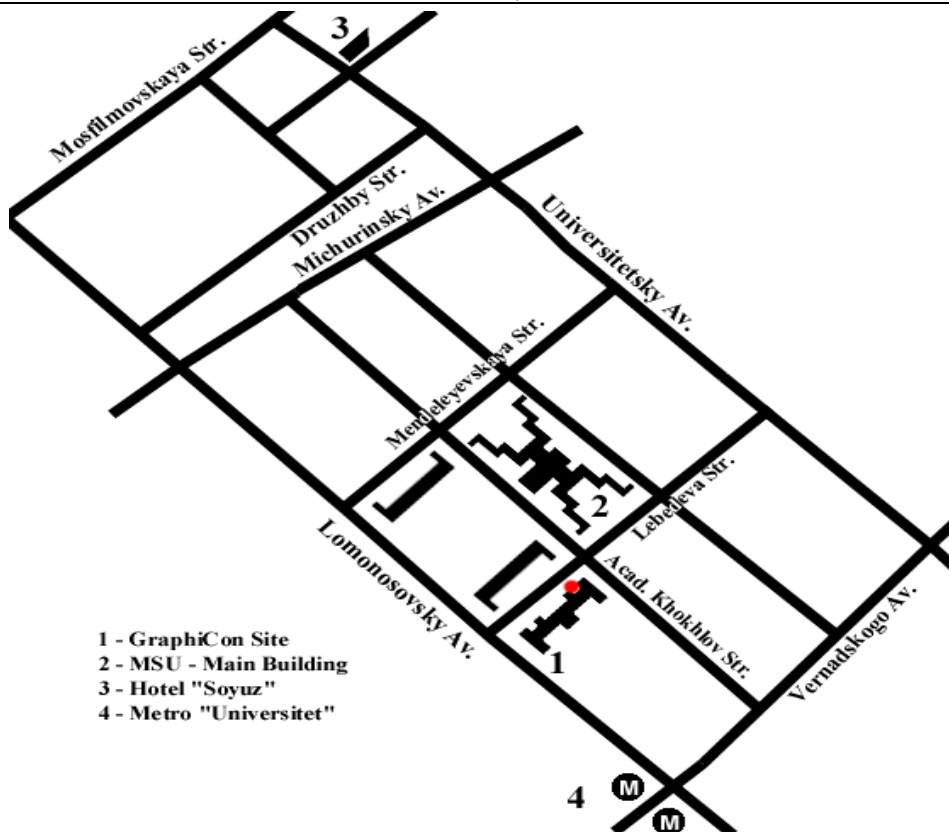
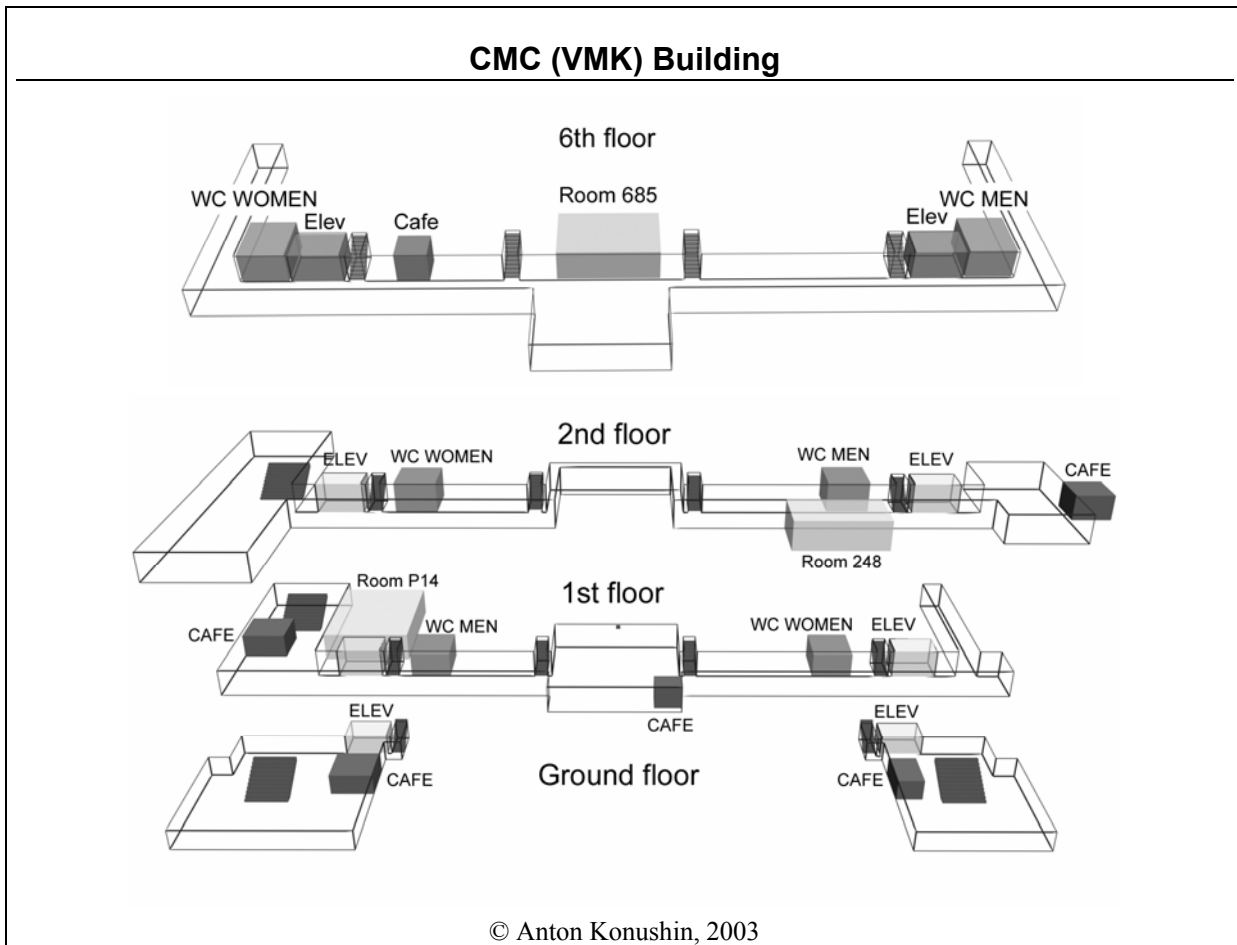
Specialist in image, video and data compression (fractal image compression, wavelet video compression, fast loss-less data compression, best loss-less video compression) with more than 8 years experience (7 commercial projects). Ph.D. in graphics compression. Studied video and image processing methods for various applications. Application of different mathematical methods, including signal processing methods for postfiltering (deranging, deblocking, loop-filtering), prefiltering (denoising, deinterlasing, rescaling). Books: "Image compression algorithms" (D.Vatolin), "Data compression methods" (D.Vatolin, A.Ratushniak, M.Smironov, V.Yukin); several scientific articles; reports on scientific conferences. Founder of the biggest Russian site with scientific information about data compression www.compression.ru.

Zhirkov Alexander, Ph.D. student

Specialist in areas of sound, image, video and 3D-movies data compression. Especially in contextual modeling in video, object-oriented audio coding, wavelet-based image compression, clustering-based texture compression and 3D-movies representation. Author of octreeimage-based representations and rendering. Also his research interests includes fractal and multiscale analysis, object and speech recognition, subpixel image analysis, artificial neural networks, chaos and synergetic. He has more than 10 scientific articles and 2 accepted international patents.

Schedule of coffee and lunch breaks are up to the tutorial organizers.

The conference takes place at the Department of Computational Mathematics and Cybernetics (CMC Building).



The conference is organized by Moscow State University
and is dedicated to its 250 anniversary



In cooperation with Eurographics Association, Keldysh Institute for
Applied Mathematics of RAS, RL Labs JSC



Sponsored by Intel Corp., supported by Russian Systems Corporation
and Microsoft Research Ltd.



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