

# **GraVisMa 2009**

## **Graphics, Vision and Mathematics**

**<http://GeometryAlgebra.zcu.cz/GraVisMa>**

held at

University of West Bohemia – Campus Bory  
Faculty of Applied Sciences  
Department of Computer Science and Engineering  
Center of Computer Graphics and Visualization  
<http://Graphics.zcu.cz>

September 3 - 5, 2009

### **Workshop Program**

### **Workshop Co-Chairs**

**Vaclav Skala**, University of West Bohemia, Czech Republic  
**Dietmar Hildenbrand**, Technical University Darmstadt, Germany

**Supporting organizations:** University of West Bohemia, Microsoft Czech Rep.

<b>Workshop Program</b>		
Some changes within a day schedule can be expected		
<b>Wednesday, September 2, 2009</b>		
<b>Registration 8:00 - 9:00 at University of West Bohemia, Campus Bory</b>		
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<b>9:00 - 10:40 Session A</b>	<b>Chair: Joan Lasenby</b>	
<b>Workshop Opening</b>		
• Deul,C, Burger.M, Hildenbrand.D., Koch.A: Raytracing Point Clouds using Geometric Algebra A83		1
• Hasegawa,M.: A Study of 3-D Surface Registration Using Distance Map and 3-D Radon Transform B89		2
• Sabov,A., Krüger,J.: Virtual Reconstruction of 3D Scenes Based on Range Cameras A29		3
• Wörsdörfer,F., Stock,F., Bayro-Corrochano,E., Hildenbrand,D.: Using Geometric Algebra for Algorithms Calculating Convex Hull and Object Representation in 3D B07		4
<b>Coffee break</b>		
<b>11:00 - 12:00 Session B - Keynote</b>		
	<b>Chair: Vaclav Skala</b>	
• Dorst,L.: Conformal Geometric Algebra by Extended Vahlen Matrices B37		5
• Tachibana,K.: Motion Tracking with Geometric Algebra-valued Particle Filter B97		6
<b>Common photo</b>		
<b>Lunch break</b>		
<b>13:00 - 14:40 Session C</b>		
	<b>Chair: Leo Dorst</b>	
• Cui,Y., Hildenbrand,D.: Pose Estimation Based on Geometric Algebra A59		7
• Lee,S.W., Nestler,A.: Spherical Offset B43		8
• Candy,L., Lasenby,J.: Inertial Navigation using Geometric Algebra B83		9
• Skala,V.: Duality and Computation in Projective Space B02		10
• Seeman,M., Zemcik,P.: Histogram Smoothing for Bilateral Filter C29		11
<b>15:00 - 16:40 Session D - Communications</b>		
	<b>Chair: Libor Vasa</b>	
• Warszawski,K., Nikiel,S., Filipczuk,P.: Particle Systems for Riverbed Modeling over Multilayer Height-field Data with Hardness B23		12
• Zemcik,P., Hanak,I.: Numerical Method for Accelerated Point Light Source Optical Field Calculation C05		13
• Drahoš,P.: Reusable Performance Driven Facial Animation System C07		14
• Lacko,J., Maričák,M.: Context Based Controlled Virtual Tours using Viewpoint Entropy for Virtual Environments C17		15
• Bocek,J., Kolcun, A.: Shading of Bézier Patches B79		16
• Torrens,F., Castellano,G.: Macromolecular Structure Interrogation New Tool A47		17
• Sasipalli,V.S.R.: POSTER: Forecasting Strategy Changes in Organizations B17		44

<b>Thursday, September 3, 2009</b>		
<b>9:00 - 10:40 Session E</b>		<b>Chair: Dietmar Hildenbrand</b>
<ul style="list-style-type: none"> <li>Schwinn,C., Görlitz,A., Hildenbrand,D.: Geometric Algebra Computing on the CUDA Platform A67</li> </ul>		18
<ul style="list-style-type: none"> <li>Kooijman,A., Vergeest,J.: A GPU Supported Approach to the Partial Registration of 3D Scan Data A79</li> </ul>		19
<ul style="list-style-type: none"> <li>Fassold,H., Rosner,J., Schallauer,P., Bailer,W.: Realtime KLT Feature Point Tracking for High Definition Video A89</li> </ul>		20
<ul style="list-style-type: none"> <li>Urban,J., Vaněk,J.: Preprocessing of Microscopy Images via Shannon's Entropy A97</li> </ul>		21
<ul style="list-style-type: none"> <li>Kurasova,O., Molyte,A.: Integrated Visualization of Vector Quantization by Multidimensional Scaling A53</li> </ul>		22
<ul style="list-style-type: none"> <li>Amjoun,R., Strasser,W.: Adaptive Segmentation of Deforming Mesh Sequence into Near-Rigid Clusters C02</li> </ul>		23
<b>Coffee break</b>		
<b>11:00 - 12:00 Session F - Keynote</b>		<b>Chair: Anthony Lasenby</b>
<ul style="list-style-type: none"> <li>Benger,W., Hamilton,A., Folk,M., Koziol,Q., Su,S., Schnetter,E., Ritter,M., Ritter,G.: Using Geometric Algebra for Navigation in Riemannian and Hard Disc Space B73</li> <li><b>Panel discussion</b></li> </ul>		24
<b>Lunch break</b>		
<b>13:00 - 14:40 Session G - Communications</b>		<b>Chair: Alexej Kolcun</b>
<ul style="list-style-type: none"> <li>Malpica,J.A., Alonso,M.C.: Goodness-of-fit Tests for Brightness Distribution in Grey Level Images B13</li> </ul>		25
<ul style="list-style-type: none"> <li>Protopsaltou,A., Fudos,I.: Creating Editable 3D CAD Models from Point Cloud Slices B19</li> </ul>		26
<ul style="list-style-type: none"> <li>Mashtalir,S., Putyatin,E.: Image Normalization under Projective Transforms B47</li> </ul>		27
<ul style="list-style-type: none"> <li>Medvedev,V., Dzemyda,G.: Neural Network-Based Large Datasets Visualization Using a Reduced Training Subset B53</li> </ul>		28
<ul style="list-style-type: none"> <li>Anton,F., Aaneas,H., Kahl F.: The Three Point Perspective Pose Estimation Problem Revisited with Invariants Obtained from Polynomial Triangulation and Interval Analysis C03</li> </ul>		42
<ul style="list-style-type: none"> <li>Chellali,R.: Augmenting Scenes: an Interactive Tool for Un-calibrated Cameras C23</li> </ul>		
<ul style="list-style-type: none"> <li>Mutlu,E., Orkun,D.B., Kafarov,R.: Virtual Aided Sensor System(VASS) for Vehicles A71</li> </ul>		
<ul style="list-style-type: none"> <li>Treigys,P., Dzemyda,G., Veikutis,V.: POSTER: Investigation of Thermal Anisotropy from Thermovisual Video Data B59</li> </ul>		45
<b>Coffee break</b>		
<b>15:00 - 16:00 Session H - Keynote</b>		<b>Chair: Werner Benger</b>
<ul style="list-style-type: none"> <li>Hitzer,E.: Fourier and Wavelet Transformations in Geometric Algebra C31</li> <li><b>Panel discussion</b></li> </ul>		29
<b>19:00 - 21:00 Conference Dinner</b>		

<b>Friday, September 4, 2009</b>		
<b>9:00 - 10:40 Session K</b>		<b>Chair: Pavel Zemcik</b>
• Hildenbrand,D.: Geometric Algebra Computers A31		30
• Dorst,L.: Determining an Even Versor in n-D Geometric Algebra from the Known Transformation of n Vectors B31		31
• Simpson,L., Mullineux,G.: Exponentials and Motions in Geometric Algebra A37		32
• Cibura,C., Dorst,L.: From Exact Correspondence Data to Conformal Transformations in Closed Form Using Vahlen Matrices B29		33
• Fleischmann,O., Wietzke,L., Sommer,G.: A Monogenic Signal on the Two-Sphere with Applications in Omnidirectional Vision B05		34
<b>Coffee break</b>		
<b>11:00 - 12:00 Session L - Keynote</b>		<b>Chair: Dietmar Hildenbrand</b>
• Lasenby,A., Doran,C., Lasenby,R.: Rigid Body Motion and Conformal Geometric Algebra C19		35
• <b>Panel discussion</b>		
<b>Lunch break</b>		
<b>13:00 - 14:40 Session M - Communications</b>		<b>Chair: Eckhard M.S.Hitzer</b>
• Zemcik,P., Pribyl,B.: Precise Image Resampling Algorithm C13		36
• Marcinkevicius,V., Medvedev,V.: Mining and Visualizing Web Logs for the Analysis of Users' Behavior B41		37
• Margenstern,M.: About Contour Words of Balls in Tessellations of the Hyperbolic Plane C47		38
• Carpentieri,B.: Hyperpectral Images: Compression and Visualization A73		39
• Kapec,P.: Hypergraph-based Software Visualization C11		40
• Tytkowski,K.T.: The BPT Algorithm (Brianchon - Point - Triangle) - Detecting Conical Curves in Raster Graphics B03		41
<b>Coffee break</b>		
<b>15:00 - 17:00 Session T</b>		<b>Chair: Vaclav Skala</b>
• Lina,Z., Hongbo,L.: Catadioptric Omnidirectional Camera Calibration using Conformal Geometric Algebra B71		
• Liu,H., He,H.-Q.: An Improved Data Scheduling Method in Large-scale Terrain Rendering B11		
• Ananthashayana,V.K., Jinesh,V.N.: Face Recognition with Single Known Image in Database A43		
• Cakar,T.: Simulated Annealing Approach for Single Robot Total Weighted Tardiness Problem A05		
• Zhao,L., Su,L.: Catadioptric Camera Calibration Based on Single B67		
• Khalifa,E., Hamd,S., Kaboudan,A., Aiad,A.O.: Ray Tracer Acceleration Using GPU with CUDA & Image Space Model A07		
• Vatavu,R.-D.: Enhancing Human-Human Interactions with Visual Expressive Digital Content B61		
<b>Closing session</b>		

**Internet connection in the Conference office room:**

**Username:** .....

**Password:** .....

**Other activities**

- **Tuesday, September 1**  
**Plzen city – tour in glance** – you can join me  
**Meeting point:** nam.Republiky (main square) at the church entrance point on **15:00 – Changed !!!**  
**Expenses** – not compulsory – for entry tickets approx.: 2 EUR to the top of the tower, 4 EUR for the Brewery museum visit, 3 EUR for Plzen city historical underground, Beer tasting session – approx. 1.5 EUR/pint
  
- **Wednesday, September 2**  
**Pilsner Urquell brewery pub Spilka** - you can join me  
**Meeting point:** nam.Republiky (main square) at the church entrance point on 18:30
  - Beer tasting session – approx. 1.5 EUR/pint, Dinner – approx. 5 EUR/dish
  
- **Friday, September 4**  
Please, check the **Information desk** at the Conference Office
  
- **Saturday, September 5 – in the case of bad weather, trip can be cancelled**  
**Prague Golden European city – tour in glance** – you can join me in visiting the Prague best places – expected length 3-4 hours.  
**You need to by a bus ticket from the Student Agency** (bus company) in advance – recommended just when you arrive to Prague Airport or to Plzen bus station (busses are usually full in the morning)  
**Meeting point:** Central bus station, 6:55 MORNING (takes about 2 hours to get to the Prague center). Student agency bus leaves on 7:00 from the Central bus station, return on your own schedule  
Expenses expected:
  - Plzen-Prague bus ticket 4 EUR, Prague – Plzen bus ticket 4 EUR, One day public transport in Prague 7 EUR, Entry fee if you decide to visit some exhibition etc. – approx. 5-7 EUR/eachAfter the tour you will have chance to visit several places on your own.  
**Bus ticket can be returned before bus departure – if you would need**