

Curriculum Vitae

Andrei V. Sherstyuk

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EDUCATION

Ph.D. Computer Science, Monash University, Australia.	1999
M.S. Computer Science, California Institute of Technology, USA.	1994
B.S. Physics, Novosibirsk State University, USSR.	1989

DISSERTATION

Convolution Surfaces in Computer Graphics

EMPLOYMENT

University of Hawaii, Neuroscience and MR Research Program – MR Computer Specialist	2011 –present
Avatar Reality Inc. – Senior Programmer.	2008 – 2011
University of Hawaii, Telehealth Research Institute – Research Scientist	2002 – 2008
SquareUSA Inc. – Research and Development.	1999 – 2002
NCR/AT&T Company – Consultant.	1993 – 1994
NCR Corporation – Consultant.	1991 – 1993
Institute of Telemetry, Academy Of Science, USSR – Research Fellow.	1986 – 1991

AREAS OF EXPERTISE

Computational geometry, computer graphics and applications.
Virtual Reality, augmented Reality, mixed Reality systems.
3D Human Computer interfaces and 3D UI metaphors.
Enhanced rendering techniques for HMD-based virtual reality systems.
Virtual presence and cross-reality interactions.
Motion representation and editing.
Shape representation, level of detail.
Implicit surfaces and convolution surfaces: modeling, rendering, animation.
Modeling of natural phenomena with implicit surfaces.
Physically-based modeling and simulation.
High-quality rendering.
Non-contact ray-surface interactions in ray-tracing.

JOURNAL AND CONFERENCE PAPERS

A. Sherstyuk, A. Dey, C. Sandor, A. State (2012).

Dynamic Eye Convergence for Head-mounted Displays Improves User Performance in Virtual Environments.

ACM SIGGRAPH Symposium on Interactive 3D Graphics and Games, (I3D'12), March 9-11, Costa Mesa, USA, 2012 (forthcoming).

A. Sherstyuk, A. Treskunov, M. Gavrilova (2012).

Predator-Prey Vision Metaphor for Multi-Tasking Virtual Environments.

IEEE Symposium on 3D User Interfaces (3DUI'12), March 4-5, Costa Mesa, USA, 2012 (forthcoming).

A. Sherstyuk, C. Jay, A. Treskunov (2011).

Impact of Hand-Assisted Viewing on User Performance and Learning Patterns in Virtual Environments.

The Visual Computer, Springer, 27(3), pp. 173-185, 2011.

A. Sherstyuk, M. Gavrilova (2011).

Virtual Roommates: Sampling and Reconstructing Presence in Multiple Shared Spaces.

Chapter in "*Handbook of Augmented Reality*" book, Borko Furht (ed.), Springer, 2011.

A. Sherstyuk, D. Vincent, B. Berg, A. Treskunov (2011).

Mixed Reality Manikins for Medical Education.

Chapter in "*Handbook of Augmented Reality*" book, Borko Furht (ed.), Springer, 2011.

A. Sherstyuk, M. Gavrilova (2011).

Virtual Roommates in Multiple Shared Spaces.

The 1st International Symposium on Virtual Reality Innovation (ISVRI), Singapore, March 19-20, pp. 81-88, 2011.

A. Sherstyuk, S. Olle, J. Sink (2010).

Blue Mars Chronicles: Building for Millions.

The 3rd ACM SIGGRAPH Conference and Interactive Techniques in Asia (SIGGRAPH ASIA), Technical Sketches, Seoul, Dec 15-18, 2010.

A. Sherstyuk, A.State (2010).

Dynamic Eye Convergence for Head Mounted Displays.

The 17th ACM Symposium on Virtual Reality Software and Technology (VRST) 2010, Hong Kong, Nov 21-23, 2010.

A. Sherstyuk, D.Vincent, K. L. Wang (2010).

Making First Steps in VR: Monitoring User Progress in Virtual Travel.,

The 17th ACM Symposium on Virtual Reality Software and Technology (VRST) 2010, Hong Kong, Nov 21-23, 2010.

A. Sherstyuk, D.Vincent, A. Treskunov (2010).

Toward Natural Selection in Virtual Reality,

IEEE Computer Graphics and Applications, March 2010.

A. Sherstyuk, A. Treskunov, B. Berg (2010).

Semi-Automatic Surface Scanner for Medical Tangible User Interfaces

International Journal of Image and Graphics, February 2010.

- A. Sherstyuk, A. Treskunov (2009).
Dynamic Light Amplification for Immersive Environment Rendering,
The 8th ACM International Conference on Virtual-Reality Continuum and its Applications in Industry (VRCAI), pp. 247-251, Yokohama, Japan, December 14-15, 2009.
- A. Sherstyuk, A. Treskunov (2009).
Collision-free Travel with Terrain Maps,
The 8th ACM International Conference on Virtual-Reality Continuum and its Applications in Industry (VRCAI) , pp. 175-178, Yokohama, Japan, December 14-15, 2009.
- A. Sherstyuk, K. Wang, A. Treskunov, J. Pair (2008).
Real Binoculars with Virtual Functions for Mixed Environments
International Conference on Advances in Computer Entertainment Technology ACE'08, Yokohama, Japan, December 2008.
- A. Sherstyuk, K.-H. Chu, S. Joseph (2008).
Virtual Roommates in Ambient Telepresence Applications ,
International Conference on Artificial Reality and Telexistence ICAT'08, Yokohama, Japan, pp. 234-237, December 2008.
- A. Sherstyuk, D. Vincent, C. Jay (2008).
Sliding Viewports for Interactive Immersive Environments ,
International Conference on Artificial Reality and Telexistence ICAT'08, Yokohama, Japan, December 2008.
- A. Sherstyuk, D. Vincent, B. Berg (2008).
Creating Mixed Reality Manikins for Medical Education,
International Conference on Artificial Reality and Telexistence ICAT'08, Yokohama, Japan, December 2008.
- D. Vincent, A. Sherstyuk, L. Burgess, K. Connolly (2008).
Teaching Mass Casualty Triage Skills using Immersive 3D Virtual Reality
Academic Emergency Medicine Journal, November, Vol 15(11), pp. 1160-1165, November, 2008.
- A. Sherstyuk, D. Vincent, J. J. Hwa Lui, K. K. Connolly, K. L. Wang, S. M Saiki, T. P. Caudell, (2008)
Design and Development of a Pose-Based Command Language for Triage Training in Virtual Reality (Cover page),
IEEE Symposium on 3D User Interfaces, Charlotte, North Carolina, USA, March 10-14, 2007.
- A. Sherstyuk, J. Pair, A. Treskunov (2007)
Optical Sight Metaphor for Virtual Environments
IEEE Symposium on 3D User Interfaces, Charlotte, North Carolina, USA, March 10-14, 2007.
- A. Sherstyuk, K. L. Wang, A. Treskunov, J. Pair (2007)
View Enhancement Techniques for Scene Exploration and Object Selection in Virtual and Mixed Environments (Cover page),
The 4th International Workshop on the Tangible Space Initiative, Nara, Japan, November 2007.
- D. Alverson et al. (2006)
Reification of Abstract Concepts to Improve Comprehension Using Interactive Virtual Environments and a Knowledge-Based Design: A Renal Physiology Model
Medicine Meets Virtual Reality Conference, Newport Beach, California, USA, January 24-27, 2006.
- Panaiotis, V. Vergara, A. Sherstyuk, K. Kihmm, S. Saiki, D. Alverson, T. Caudell (2006)
Algorithmically Generated Music Enhances VR Nephron Simulation
Medicine Meets Virtual Reality Conference, Newport Beach, California, USA, January 24-27, 2006.

- A. Sherstyuk, C. Aschwanden, S. Saiki (2005)
Affordable Virtual Environments: Building a Virtual Beach for Clinical Use
Medicine Meets Virtual Reality Conference, Newport Beach, California, USA, 2005.
- S. Stevens et al (2005)
Virtual Reality Training Improves Students Knowledge Structures of Medical Concepts
Medicine Meets Virtual Reality Conference, IOS Press, Amsterdam, 2005.
- D. Alverson et al (2005)
Distributed immersive virtual reality simulation development for medical education
Journal of International Association of Medical Science Educators, 15(1), pp. 19-30, 2005.
- D. Alverson et al (2005)
Distributed Interactive Virtual Environments for Collaborative Experiential Learning and Training Independent of Distance over Internet2
Medicine Meets Virtual Reality Conference, Newport Beach, California, USA, January 14-17, 2004.
- M. Mowafi et al (2004)
Distributed Interactive Virtual Environments for Collaborative Medical Education and Training: Design and Characterization,
Medicine Meets Virtual Reality Conference, Newport Beach, California, USA, January 14-17, 2004.
- A. Sherstyuk (2000)
Convolution Surfaces in Computer Graphics
Open Systems, Open Systems Publications, Moscow, Russia, 4(48), pp. 72-76, 2000.
- A. Sherstyuk (1999)
Kernel functions in convolution surfaces: a comparative analysis
The Visual Computer - International Journal of Computer Graphics, Springer-Verlag, NY, USA, ISSN: 0178-2789, 15(4), pp. 171-182, 1999.
- A. Sherstyuk (1999)
Interactive shape design with convolution surfaces (Cover page)
Shape Modeling International (SMI'99), Aizu-Wakamatsu, Japan, 1-4 March, 1999.
- A. Sherstyuk (1999)
Fast ray tracing of implicit surfaces
The International Journal of the Eurographics Association, Computer Graphics Forum, Blackwell Publishers, Oxford, UK, ISSN: 0167-7055, 18(2), pp. 139-148, 1999.
- J. McCormack, A. Sherstyuk (1998).
Creating and rendering convolution surfaces,
The International Journal of the Eurographics Association, Computer Graphics Forum, Blackwell Publishers, Oxford, UK, ISSN: 0167-7055, 17(2), pp. 113-120, 1998.
- A. Sherstyuk (1998)
Fast ray tracing of implicit surfaces (Best paper, Cover page).
Third International Workshop on Implicit Surfaces (IS'98), Seattle, USA, June 15-16, 1998.
- A. Sherstyuk (1997)
Ray tracing with selective visibility (Cover page).
Journal of Graphics Tools, A K Peters Ltd, Wellesley MA USA, 1(4), pp. 41-46, 1997.

REFEREED POSTERS

A. Sherstyuk, A. Dey, C. Sandor (2012).

Head-turning Approach to Eye-tracking in Immersive Virtual Environments.

IEEE Virtual Reality Conference (VR'12), March 4-8, Costa Mesa, USA, 2012 (forthcoming).

A. Sherstyuk (2012).

Animal Reality.

ACM SIGGRAPH Symposium on Interactive 3D Graphics and Games (I3D'12), March 9-11, Costa Mesa, USA, 2012 (forthcoming).

A. Sherstyuk, D. Vincent, A. Treskunov (2009)

Towards Virtual Reality Games

The 8th ACM International Conference on Virtual-Reality Continuum and its Applications in Industry (VRCAI), Yokohama, Japan, December 14-15, 2009.

A. Sherstyuk, A. Treskunov (2009)

Dynamic Light Amplification for Head Mounted Displays

The 16th ACM Symposium on Virtual Reality Software and Technology (VRST), Kyoto, Japan, Nov 18-20, 2009.

S. Ullrich, T. Kuhlen, A. Sherstyuk (2009)

Natural hand gesture interface for medical training in Second Life

13th Annual Conference of the International Society for Computer Aided Surgery, Berlin, Germany, June 2009.

A. Sherstyuk (2008)

Haptic Wind

International Conference on Advances in Computer Entertainment Technology ACE'08, Yokohama, Japan, pp. 408, December 2008.

A. Sherstyuk, K.H. Chu, S. Joseph (2008)

Virtual Mirror for Augmented Presence Applications

International Conference on Advances in Computer Entertainment Technology ACE'08, pp. 410, Yokohama, Japan, December 2008.

A. Sherstyuk, A. Treskunov, B. Berg (2008)

Fast Geometry Acquisition for Mixed Reality Applications Using Motion Tracking

International Symposium on Mixed and Augmented Reality, ISMAR'08, Cambridge, UK, pp. 179-180, September 2008.

A. Sherstyuk, D. Vincent, C. Jay (2008)

Sliding Viewport for Head Mounted Displays in Interactive Immersive Environments

IEEE Symposium on 3D User Interfaces, Reno, Nevada, USA, pp. 135-136, March 2008.

C. Aschwanden, A. Sherstyuk, L. Burgess, K. Montgomery (2006)

A Surgical and Fine-Motor Skills Trainer for Everyone? Touch and Force-Feedback in a Virtual Reality Environment for Surgical Training

Medicine Meets Virtual Reality Conference. Newport Beach, California, USA, January 24-27, 2006.

D. Alverson et al (2005)

Reification of Abstract Concepts to Improve Comprehension Using Interactive Virtual Environments and a Knowledge-Based Design

International Association of Medical Science Educators 9th Annual Meeting, Los Angeles, CA, July 2005.

K. Kihmm, A. Sherstyuk, S. Saiki, D. Alverson, T. Caudell (2005)

2D versus 3D in Virtual Reality, a Comparison

Human Computer Interface International, Las Vegas, July 2005.

K. Kihmm, A. Sherstyuk, K. Summers, T. Eyring, S. Smith, P. Weber, T. Caudell (2004)

The Flatland Architecture, An Open Source Visualization/Virtual Reality Development Environment

Computer Graphics (SIGGRAPH '04), Los Angeles, August 2004.

S. Saiki et al (2004)

Reification of Abstract Bio-Medical Concepts in Interactive Virtual Environments to Enhance Learning; a Renal Fly-Through Model

Medicine Meets Virtual Reality Conference, Newport Beach, California, USA, January 14-17, 2004.

INVENTION DISCLOSURES

University of Hawaii Office of Technology Transfer and Economic Development, Invention Disclosure and US Provisional Patent Application, 2008

- Multimodal augmented reality interface for teaching health care skills, with D. Vincent, B. Berg.
- Fast Geometry Acquisition for Tangible User Interface Applications, with D. Vincent, B. Berg.
- Virtual Roommates, with S. Joseph, K.-H. Chu.

PROJECTS

Avatart-Reality Inc, Honolulu, USA , 2008 – 2011

- **BLUE MARS ONLINE SOCIAL WORLD**
Design, development and testing of 3D asset creating for online game: virtual cloth, bodies, avatar animation. Support for community developers.
- **VIRTUAL REALITY INTERFACES FOR FOR MARS ONLINE SOCIAL WORLD**
Design and implementation of immersive 3D interfaces for Blue Mars online social world, for training, education and community outreach.

University of Hawaii, Telehealth Research Institute, USA, 2002 – 2008

- **AUGMENTED MANIKINS FOR MEDICAL EDUCATION**
Human patient simulators, or manikins, are a well established method of teaching medical skills. Applying techniques of Virtual and Augmented Reality fields can significantly expand manikin functionality, at relatively low costs. A working prototype was created and presented at Asia Pacific Military Medicine Conference held in Singapore in April 2008.
- **VIEW ENHANCEMENT TECHNIQUES FOR VIRTUAL ENVIRONMENTS**
A family of novel human-computer interface techniques were developed and implemented. The results were presented and published at IEEE VR conference in 2007. Additional user validation experimental studies were conducted at the School of Medicine, University of Hawaii, 2007.
- **MASS CASUALTY TRIAGE IN VIRTUAL REALITY**
Design and development of a prototype of the system for conducting triage in virtual reality. Supervised development of virtual patients and 3D effects, designed and implemented a novel command language interface based on human poses and gestures. The results were presented and published at IEEE VR conference in 2007. VR Triage system was extensively used in additional sense of presence studies at University of Hawaii in 2006, navigation-control studies at Medicine Meets Virtual Reality conference in 2007, interface evaluation studies at School of Medicine, University of Hawaii, 2007.

- **VIRTUAL REALITY BEHAVIORAL HEALTH**
Directed development of a Virtual Beach simulator for biofeedback and pain control experiments. Duties and responsibilities: managing a team of artists doing 3D modeling and animation; hardware configuration, setup and testing; software development for animation and shape representation; optimization techniques for 3D visualization; 3D sound; human-computer interactions; integration with the motion tracking system. The system is currently installed at the Tripler Army Hospital in Hawaii, Department of Psychology.
- **VIRTUAL HEMATOMA**
Development of an immersive Virtual Reality hematoma simulator for medical education. Provided integration with Maya authoring tool: plugins to export models, shaders and animations. Character setup in Maya and programming support for a skeletal-based animation.
- **VIRTUAL KIDNEY**
Development of a human kidney simulator, with a detailed visualization of data flow of various components.
- **TELEMEDICINE CURRICULUM**
Participated in writing a Web-based curriculum for civil and military doctors, with an emphasis on Simulation and Virtual Reality applications.

SquareUSA Inc, USA, 1999 – 2002

- **“FINAL FANTASY XI” GAME FOR PLAYSTATION 2**
Developed a skeleton-based animation system for compact motion representation and editing, with optional data compression. Participated in development of authoring tools and plugins for the production of the game: export of shapes, shaders and motion from Maya to Playstation 2.
- **“FINAL FANTASY: THE SPIRITS WITHIN” CG FEATURE FILM**
Participated in development of a simulation system for animation of flexible objects, such as clothes and hair. Developed Maya plugins for interactive simplification of polygonal shapes with feature preservation; plugins for fast visualization of animated sequences, with high-quality rendering.

NCR/AT&T Company, USA, 1991 – 1994

- **NATURAL LANGUAGE PROCESSING**
Developed and implemented a system for resolving use of pronouns in natural language data inquiries, resolving of grammatically incomplete and terse questions, similar to ones used in everyday speech, evaluation of ambiguities and time-related information.
- **TCP/IP NETWORKING FOR ASKNCR(TM)**
askNCR(tm) is a distributed information processing system with a natural language user interface. Network support includes: text and voice messages, network phone services, teleconferencing, access of remote data, execution of remote code.

Institute of Telemetry, Academy Of Science, USSR, 1986 – 1991

- **X.25 NETWORKING**
Design, development and testing of software for packet-switching equipment. Frame-level libraries with error recovery for noisy/unstable network conditions.
- **ROM MONITOR FOR VME-BUS PC-SYSTEM**
Fully functional ROM-monitor program with inline assembler/deassembler for I-8086 instruction set, memory and register access, code execution with break points and jumps.

PRESENTATIONS AND EXHIBITIONS

Presentations of interactive 3D systems, including Virtual Reality systems, at various conferences, meetings, and workshops.

- **VIRTUAL MARS.**
Immersive Virtual Mars Environment demonstration, presented at the JUSTSAP Symposium: Japan-U.S. Science, Technology and Space Applications Program, Hawaii, Big Island, November 17th, 2010.
- **MIXED REALITY MEDICAL MANIKINS.**
Prototype demo and user study at Medical Simulation Workshop, Singapore Armed Forces Medical Training Institute, April 16th, 2008.
- **SLIDING VIEWPORT FOR VIRTUAL REALITY SYSTEMS.**
Experimental study, University of Hawaii, 2008.
- **VR TRIAGE, MULTIPLE STUDIES.**
Multi-stage experimental studies on sense of presence and educational efficiency, University of Hawaii, 2007.
- **VIRTUAL NAVIGATION STUDY.**
Exhibition demo and experimental study on virtual navigation, Medicine Meets Virtual Reality Conference, Long Beach CA, 2007.
- **“THE WATERS OF LIFE: A REIFIED VOYAGE INTO THE KIDNEY”**
Computer simulation at “The Art And Artifice of Science Exhibition”, Fine Arts Museum, Santa Fe, New Mexico, 2006.
- **VIRTUAL BEACH, HEMATOMA, HUMAN KIDNEY.**
Medical virtual reality presentations at AIMS Meeting for members of Congress (Educating America about the value of Medical Simulation), Washington DC, 2005.
- **VIRTUAL BEACH, HEMATOMA, HUMAN KIDNEY.**
Exhibition demos at Medicine Meets Virtual Reality Conference, Long Beach CA, 2005.
- **VIRTUAL HEMATOMA.**
Live collaborative presentation at the Techs in Paradise Conference, University of Hawaii, 2004.
- **VIRTUAL HEMATOMA, PBL LABORATORY.**
Problem based learning case, experimental study, University of Hawaii, 2004.
- **VIRTUAL BEACH.**
Exhibition demo, Medicine Meets Virtual Reality Conference, Long Beach CA, 2004.
- **FINAL FANTASY INTERACTIVE EXPERIENCE, PC.**
Real-time 3d cinematic playback of the Final Fantasy movie sequence on a PC, 135 seconds, two CG characters. SIGGRAPH Exhibition, 2001.
- **FINAL FANTASY INTERACTIVE EXPERIENCE, SONY GS-CUBE.**
Real-time 3d cinematic playback of a FF movie sequence on Sony GSCube(tm) 45 seconds, one CG character. SIGGRAPH Exhibition, 2000.

OTHER PROFESSIONAL ACTIVITIES AND SERVICE

Member of International Program Committees:

IEEE Symposium on 3D User Interfaces (3DUI) 2012
SIGGRAPH ASIA, Technical Papers and Sketches, 2010, 2011
International Symposium on Mixed and Augmented Reality (ISMAR) 2008, 2009, 2010, 2011
International Conference on Advances in Computer Entertainment Technology (ACE) 2008, 2009, 2010, 2011
IEEE Virtual Reality Conference (VR) 2009
International Conference on Artificial Reality and Telexistence (ICAT) 2008
International Symposium Cyber Worlds (CW), 2001, 2009, 2010, 2011, 2012
IASTED International Conference on Imaging and Signal Processing in Healthcare and Technology (IS-PHT) 2011, 2012
IASTED International Conference on Telehealth, 2007, 2008, 2012
Shape Modeling International Conference (SMI) 2001
Spring Conference on Computer Graphics, 2001

Reviewing:

International Journal on Graphical Models 2011
IEEE Robotics and Automation Magazine 2010
IEEE Transactions on Visualization and Computer Graphics (TVCG) 2009
The Visual Computer Journal 2004
ACM SIGGRAPH Annual Conference 1999, 2000, 2001, 2002
ACM Solid Modeling Conference, 2000

Member of ACM, IEEE.

REFERENCES

Marie-Paule Cani, Professor, Grenoble Institute of Technology, France. Marie-Paule.Cani@inrialpes.fr

Vladimir Savchenko, Professor, Hosei University, Tokyo, Japan. vsavchen@k.hosei.ac.jp

Benjamin Berg, Director of Simulation, Telehealth Research Institute, University of Hawaii, bwberg@hawaii.edu

Dale Vincent, Director of Telemedicine, Telehealth Research Institute, University of Hawaii, dvincent@hawaii.edu

Marina L. Gavrilova, Associate Professor, University of Calgary, Department of Computer Science, marina@cpsc.ucalgary.ca

Kimberly Binsted, Associate Professor, University of Hawaii, Department of Computer Science, binsted@hawaii.edu