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## **EDUCATION**

2001 PhD in Computer Science from Swiss Federal Institute of Technology, Lausanne, EPFL, advisor D. Thalmann, co-advisor P. Fua

1996 Engineering Diploma from Swiss Federal Institute of Technology Zurich, ETH

## **PROFESSIONAL HISTORY**

Sabanci University, Turkey, Associate Professor, 2013 to present

VisioThink Inc, Turkey, Partner, 2006 to present.

VisioThink is a Business Intelligence and Visual Analytics company focusing on geographical business data processing. VisioThink provides software solutions to finance, retail and telecom companies.

Sabanci University, Turkey, Assistant Professor, 2004 - 2012

Established the Computer Graphics Laboratory of Sabanci University with close collaboration with local and international industry and funding agencies.

Nokia Research Centre, USA: Senior Research Engineer, July 2001 to February 2004

Represented Nokia at W3C and 3GPP on mobile graphics. Drafted the augmented reality roadmap of Nokia in 2003.

EPFL, Switzerland: Research Assistant, July 1996 to July 2001

Webster University, Switzerland: Adjunct Faculty, Fall 2000

## **CURRENT RESEARCH INTERESTS**

Virtual and Augmented Reality

Information Visualization and Visual Analytics

Mobile Graphics

Cultural Heritage

## **TEACHING EXPERIENCE**

Sabanci University:

Computer Graphics, undergraduate class, 3 hours a week  
Course includes a 3D game competition with Jury members from Turkish game industry, Since 2004 every Fall Semester.

Computing and Arts, undergraduate class, 3 hours a week  
Since 2004 every Spring Semester (together with Elif Ayiter, Murat Germen)

Simulation and Animation of Motion, graduate class, 3 hours a week  
Spring Semester, 2004, 2005 (together with Serhat Yesilyurt)

Computer Graphics and Visualization, graduate class, 3 hours a week  
Since 2004 every second year

Virtual Reality, graduate class, 3 hours a week  
Since 2006 every second year

Graduation Projects for every year 2-5 projects per year

Webster University:

Java Programming, undergraduate class, 3 hours a week, Fall 2000

## **ADVISING GRADUATE STUDENTS**

PhD candidates:

C. Kayalar, E. Kaya, E. Koc

Master candidates:

C. Doger,

## **GRADUATE STUDENTS**

1. Basak Alper obtained her M.S. degree in 2006. 'Dynamic Visualization of Geographic Networks using Surface Deformations'
2. Selcuk Sumengen obtained his M.S. degree in 2006. 'Real-time Deformable Objects in Collaborative Virtual Environments'
3. Ceren Kayalar obtained her M.S. degree in 2006. 'Natural Interaction Framework for Pedestrian Navigation Systems on Mobile Devices'
4. Can Ozmen obtained his M.S. degree in 2007. 'A Software System to Work with 3D Models in Cultural Heritage Research '
5. Uraz Turker obtained his M.S. degree in 2008 'Visualization of Large Temporal Social Network Datasets'

6. Billur Engin obtained her M.S. degree in 2008 ‘Introduction of Level of Detail to 3D Thematic Maps’
7. Cagatay Turkyay obtained his M.S. degree in 2009 ‘An Information Theoretical Approach to Crowd Simulation’
8. Serdar Cakıcı obtained his M.S. degree in 2009 ‘ A Virtual Reality based approach to Protein-Protein Docking Problem’
9. Berkay Kaya obtained his M.S. degree in 2009 ‘Multi-Resolution Visualization of Geographic Network Traffic’
10. Merve Cayli obtained her M.S. degree in 2009 ‘Interactive Visualization of Heterogenous Social Networks Using Glyphs’
11. Demet Yılmaz obtained her M.S. degree in 2010 ‘Visual Analysis of Multiple Route Deviations’
12. Emre Koç obtained his M.S. degree in 2011 ‘Estimation of Environmental Lighting from Human Face for Illumination of Augmented Reality Scenes’
13. Ekrem Serin obtained his PhD degree in 2012 ‘Information Theory Assisted Data Visualization and Exploration’
14. Serdar Adalı obtained his M.S. degree in 2012 ‘Visualization for Exploratory Analysis of Spatio-Temporal Data’
15. Selçuk Sümengen obtained his PhD degree in 2013 ‘Entropy Guided Visualization and Analysis of Multivariate Spatio-temporal Data Generated by Physically based Simulation’
16. Tolga Eren obtained his PhD degree in 2013 ‘Scene Creation and Exploration in Outdoor Augmented Reality’

## **ADMINISTRATIVE DUTIES**

Computer Science Program:

Computer Science and Engineering Program Coordinator 2008 - 2010

Faculty of Engineering and Natural Sciences:

Coordinator of Research and Industry Committee

Member of Laboratory Committee

## **SERVICE ACTIVITIES**

### Editorial Board Memberships

1. The Visual Computer, Springer, since 2008
2. Metaverse Creativity, Intellect, since 2009
3. International Journal of Creative Interfaces and Computer Graphics, IGI-Global, since 2009

### Conference and Program Chair

1. Computer Graphics International, 2008
2. CASA, 2013

### Conference Organizing Committee Member

1. International Symposium on Computer and Information Sciences 2006, Istanbul, Turkey

### Program Committee Member

1. IEEE International Conference on Pervasive Services 2007, 2008
2. International Conference on Cyberworlds since 2006
3. International Symposium on Computer and Information Sciences, 2007
4. Digital Tasarım Günleri, 2005, 2008
5. USMOS, 2007, 2009, 2011
6. International Multi Media Modelling (MMM) Conference, since 2007
7. ACM Virtual Reality Continuum and Its Applications in Industry Conference 2008
8. SIP Conference 2008
9. Computer Graphics International, since 2008

### Professional Organizations

1. IEEE Computer, Turkey Chapter Chair 2007 - 2008

### Expertises

1. Expert for Turkish National Science Foundation (TUBITAK)

### Reviewer for:

- IEEE Transactions on Visualization and Computer Graphics
- EUROGRAPHICS
- IEEE VR
- IEEE Transactions on Information Technology in Biomedicine
- Journal of Computer Animation and Virtual Worlds
- Computer Graphics International
- Design Studies

Invited talks:

1. “Creating Virtual Environments in a Multidisciplinary Classroom”, E-Transformation in Learning; Sabanci University; April 2005; Digital Tasarim Gunleri; Yildiz Teknik University; June 2005; Computer Vision Lab, EPFL, Switzerland September 2005;
2. ‘Building a Visual Analytics Workflow for Location Based Services’, University of Bologna, IBM Research Almaden, 2013

Granted Patents:

1. World Patent 7,064,760. Method and apparatus for extending structured content to support streaming, Capin, Tolga K.; Balcisoy, Selim S. (filed 2003, granted June 2006)

Filed Patent Applications:

1. Progressive downloading of timed multimedia content, with M. Karczewicz and T. Capin, 2004

**AWARDS**

IBM Faculty Award, 2007

Turkish National Science Foundation Career Award, 2006

## **RESEARCH PROJECTS**

### **National Projects**

2012-2014 Principal Investigator in Turkish National Science Foundation and Italian Ministry of Foreign Affairs researcher exchange project ‘Augmented Reality for Research, Field and Museums’ (9.000 EUR for 2012-2014)

### **Completed Projects**

2010-2012 Principal Investigator for two Turk Telekom research grant on Mobile Augmented Reality (150.000 EUR for 2010 – 2012)

2009-2011 Principal Investigator in Turkish National Science Foundation Research Project ‘An Information Theoretical Approach to Social Network Visualization’ (70.000 EUR for 2009-2011)

2006-2011 Principal Investigator in Turkish National Science Foundation Career Award Project “Development of an Outdoors Augmented Reality System for Cultural Heritage Applications” (132.500 EUR for 2006-2011)

2007-2009 Principal Investigator in Turkish National Science Foundation and Italian Ministry of Foreign Affairs researcher exchange project ‘Virtual and Augmented Reality in Simulation and Training (VARsIT)’ (9.000 EUR for 2007-2009)

2006-2008 Co-Principal Investigator for Sabanci University Internal Research Grant “Novel Representation and interaction techniques of complex datasets” (118.000 EUR for 2006-2008)

2006-2008 Investigator in Turkish National Science Foundation Research Project “GIS supported 3D Analysis for Management Science” (31.600 EUR for 2006-2008)

2005-2007 Investigator in Turkish National Science Foundation Research Project “Computer Aided Reconstruction in Archaeology” (15.000 EUR for 2005-2007)

National Projects and Sabanci University Projects are awarded in Turkish Lira. The amounts have been converted to Euro using the exchange rate of 1 EUR = 2 TL.

## PUBLICATIONS

### Book Chapters

1. Turkey C., Koc E., Balcisoy S., "An Information Theoretical Approach to Crowd Simulation". Digital Urban Modeling and Simulation. 2012. S. Müller Arisona, G. Aschwanden, J. Halatsch, P. Wonka (eds.). Communications in Computer and Information Science (CCIS), Volume 242, Springer
2. Ayiter, Elif and Balcisoy, Selim and Germen, Murat, "3 case studies: a hybrid educational strategy for ART/SCI collaborations" Lecture Notes of the Institute for Computer Sciences, Social Informatics and Telecommunications Engineering, Volume 30, Part 2: Springer 2010
3. Kayalar C., Balcisoy S., "Natural Interaction Framework for Navigation Systems on Mobile Devices" Advances In Human Computer Interaction, Austria, 2008. I-Tech Education and Publishing
4. Sümengen, Selçuk and Eren, Tolga Mustafa and Yeşilyurt, Serhat and Balcisoy, Selim, "A multi-resolution mesh representation for deformable objects in collaborative virtual environments" Communications in Computer and Information Science, 1, Volume 21, Computer Vision and Computer Graphics. Theory and Applications, Part 1, III, Pages 75-87
5. Ozmen C., Balcisoy S., "A Software System to Work with 3D Models in Cultural Heritage Research" Beyond Illustration. Digital 2D and 3D Technologies as Tools of Discovery in Archaeology eds. Anastasia Dakouri-Hild and Bernard Frischer, Archaeopress (Oxford, UK)

### Volumes Edited & Special Issues

1. Tolga K. Çapın, Selim Balcisoy, Daniel Thalmann: Editorial, Journal of Visualization and Computer Animation 24(3-4): 153-154 (2013)
2. Tolga K. Çapın, Selim Balcisoy, Daniel Thalmann, Nadia Magnenat-Thalmann, Tat-Seng Chua: Editorial, The Visual Computer, Volume 24, Numbers 7-9, July 2008, Springer
3. Albert Levi, Erkay Savas, Hüsnü Yenigün, Selim Balcisoy, Yücel Saygin ISCIS 2006, 21th International Symposium, Istanbul, Turkey, November 1-3, 2006, Proceedings. Lecture Notes in Computer Science 4263 Springer 2006,

### Refereed Journal Publications

1. Merve Cayli, Murat Can Cobanoglu, Selim Balcisoy: GlyphLink: An interactive visualization approach for semantic graphs. J. Vis. Lang. Comput. 24(6): 463-471 (2013) (SCI)
2. Ekrem Serin, Selcuk Sumengen, Selim Balcisoy: Representational image generation for 3D objects. The Visual Computer 29(6-8): 675-684 (2013) (SCI)
3. Oktar Ozgen, Selcuk Sumengen, Marcelo Kallmann, Carlos F. M. Coimbra, Selim Balcisoy: Simulating colliding flows in smoothed particle hydrodynamics with fractional derivatives. Journal of Visualization and Computer Animation 24(5): 511-523 (2013) (SCI)
4. Kamer Ali Yüksel, Alp Yucebilgin, Selim Balcisoy, Aytül Erçil: Real-time feature-based image morphing for memory-efficient impostor rendering and animation on GPU. The Visual Computer 29(2): 131-140 (2013) (SCI)

5. Ekrem Serin, Serdar Hasan Adali, Selim Balcisoy: Automatic path generation for terrain navigation. *Computers & Graphics* 36(8): 1013-1024 (2012) (SCI)
6. Taner B., Balcisoy S., Yildizli C., Nergiz A. O., "An efficient and scalable meeting minutes generation and presentation technique", *HCI 2011, Lecture Notes in Computer Science*, Springer, 2011
7. Turkay C., Koç E., Balcisoy S., "Integrating information theory in agent-based crowd simulation behavior models", *The Computer Journal*, 2011, (SCI)
8. Bozkaya B., Yanik S., Balcisoy S. "A GIS-Based Optimization Framework for Competitive Multi-Facility Location-Routing Problem" *Networks and Spatial Economics*, 10 (3). pp. 297-320. September 2010 (SCI)
9. Cobanoglu M.C., Kindiroglu A. A., Balcisoy S., "Comparison of mobile device navigation information display alternatives from the cognitive load perspective ", *HCI 2009, Lecture Notes in Computer Science*, pp 149-157
10. Turkay C., Koc E., Balcisoy S., "An information theoretic approach to camera control for crowded scenes", *The Visual Computer*, Volume 25, Numbers 5-7, pp 451-459, (SCI)
11. Cakici S., Sumengen S., Sezerman U., Balcisoy S., "DockPro: A VR-based tool for protein-protein docking problem ", *International Journal of Virtual Reality*, 2009, 8(2), pp 19-23
12. Kayalar C., Balcisoy S., "Changing Interfaces using Natural Arm Posture - A New Interaction Paradigm for Pedestrian Navigation Systems on Mobile Devices", *Spinger Lecture Notes in Computer Science* 4555/2007, pp 431-440
13. Ozmen C., Balcisoy S., "A Framework for Working with Digitized Cultural Heritage Artefacts", *Spinger Lecture Notes in Computer Science* 4263/2006, pp 394-400
14. Balcisoy S., Ayiter E., "Trans-disciplinary avenues in education: Computing and Art", *Spinger Lecture Notes in Computer Science* 3942/2006, pp 80-89 (SCI)
15. Sannier G., Balcisoy S., Magnenat-Thalmann N., Thalmann D., "VHD: A System for Directing Real-Time Virtual Actors", *The Visual Computer*, Volume 15, Number 7/8, p.320-329, 1999. (SCI)

#### Refereed Conference Publications

1. Emre Koc, Selim Balcisoy: Estimation of Environmental Lighting from Known Geometries for Mobile Augmented Reality. *CW 2013*: 132-139
2. Mustafa Tolga Eren, Murat Cansoy, Selim Balcisoy: Multi-view augmented reality for underground exploration. *VR 2013*: 117-118
3. Ekrem Serin, Selim Balcisoy: Entropy Based Sensitivity Analysis and Visualization of Social Networks. *ASONAM 2012*: 1099-1104
4. Mustafa Tolga Eren, Selim Balcisoy, 'A Sensor Based 3D Annotation Authoring Tool for Outdoor Field Applications.' Gavrilova, Marina L. (ed.), 2011 International Conference on Cyberworlds (CW), USA: IEEE Computer Society, October 2011, 17-22
5. Eren, Tolga Mustafa and Kayalar, Ceren and Balcisoy, Selim, "An image based modelling and annotation tool for outdoor cultural heritage studies ", 39th Annual International Conference on Computer Applications and Quantitative Methods in Archaeology – CAA2011, Beijing

6. Yüksel, Kamer Ali and Erçil, Aytül and Cansoy, Murat Çelik and Balcısoy, Selim, "Augmenting conversations through context-aware multimedia retrieval based on speech recognition", 5th Workshop on Human-Computer Interaction and Information Retrieval (HCIR 2011), Mountain View, CA: Google, October 2011
7. Yüksel, Kamer Ali and Erçil, Aytül and Yücebilgin, Alp and Balcısoy, Selim, "Using image morphing for memory-efficient impostor rendering on GPU", Gavrilova, Marina L. (ed.), 2011 International Conference on Cyberworlds (CW), USA: IEEE Computer Society, October 2011, 197-202
8. Serin, Ekrem and Döğler, Candemir and Balcısoy, Selim, "3D object exploration using viewpoint and mesh saliency entropies", Gelenbe, Erol and Lent, Ricardo and Sakellari, Georgia (eds.), 26th International Symposium on Computer and Information Sciences (ISCIS 2011), London, UK: Springer, September 2011, 299-305
9. Serin, Ekrem and Adali, Serdar Hasan and Balcısoy, Selim, "Entropy assisted automated terrain navigation using traveling salesman problem", 10th International Conference on Virtual Reality Continuum and Its Applications in Industry (VRCAI 2011), Hong Kong: ACM (Association for Computing Machinery) 2011
10. Kayalar, Ceren and Balcısoy, Selim, "Look at the same screen, see differently: a discussion of view management methods in mobile augmented reality scenarios", Mobile Augmented Reality: Design Issues & Opportunities (MobileHCI 2011), Stockholm: ACM 2011
11. Cagatay Turkay, Emre Koc, Selim Balcısoy, "An Information Theory Based Behavioral Model for Agent-Based Crowd Simulations", ISCIS 2010, Lecture Notes in Electrical Engineering, 2010, Volume 62, Part 10, pp 379-382
12. Cagatay Turkay, Emre Koc, Selim Balcısoy, "Adaptive Behavioral Modeling for Crowd Simulations", The 22<sup>nd</sup> Annual Conference on Computer Animation and Social Agents, June 2009.
13. Elif Ayiter, Selim Balcısoy, Murat Germen, Bulut Sakcak and Fethi Ozdol. "The Reflexive Campus: A Study of Dynamic Architecture in a Virtual World", 2009 International Conference on Cyberworlds, CA, IEEE: IEEE Computer Society, September 2009 57-62
14. Cayci, A.; Sumengen, S.; Turkay, C.; Balcısoy, S.; Saygin, Y. "Temporal Dynamics of User Interests in Web Search Queries", Advanced Information Networking and Applications Workshops, 2009, pp 762 - 767
15. Balcısoy, Selim, Can Özmen, "Bi-manual interactive tools for cultural heritage researchers", 2008 International Conference on Cyberworlds, CA, IEEE: IEEE Computer Society, September 2008, 439-446
16. Engin B., Cetinkaya M., Ayiter E., Germen M., Balcısoy S., "Maestro: Design Challenges for a Group Calendar", 12th International Conference Information Visualisation 2008, London, UK .
17. Balcısoy, Selim, Ceren Kayalar, "Augmented reality based user interfaces to assist fieldwork on excavation sites", CAA 2008, Budapest, Hungary: Archaeolingua Foundation, April 2008
18. Elif E. Ayiter, Selim Balcısoy, Murat Germen, Ismail Kasarci, Uraz C. Turker, Merve Cayli: "Space Frames": Using space, color and animation in the visualization of complex graph systems. ICAT 2007, Proceedings. IEEE Computer Society 2007. P. 286-287

19. Bozkaya B., Balcisoy S., Engin B., 'GIS as a Decision support System for Visualizing and Solving Logistics Problems', 22<sup>nd</sup> European Conference on Operational Research 2007, Prague, Czech Republic
20. Alper B., Sumengen S., Balcisoy S., 'Dynamic Visualization of Geographic Networks Using Surface Deformations with Constraints' Computer Graphics International 2007, Petropolis, Brazil
21. Engin B. H., Koc E., Sumengen S., Balcisoy S., 'Yüksek Çözünürlüklü Arazi Verilerinin Grafik İşlemcisi Kullanılarak Görselleştirilmesi' USMOS 2007, Ankara, Turkey (Turkish)
22. Alper B., Sumengen S., Balcisoy S., 'Dynamic Visualization of Geographic Networks Using Surface Deformations with Constraints' Geoinformatics 2007 Conference, Poster Session, San Diego, USA
23. Ayiter E., Balcisoy S., Germen., Artut S., "Propagating Collaboration: An Instructional Methodology for Artists and Engineers", Ben Shneiderman, Gerhard Fischer, Elisa Giaccardi, Michael Eisenberg (Eds.): Proceedings of the 6th Conference on Creativity & Cognition, Washington, DC, USA, June 13-15, 2007. ACM 2007, ISBN 978-1-59593-712-4
24. Sumengen S., Eren M.T., Yesilyurt S., Balcisoy S., "Real-time Deformable Objects for Collaborative Virtual Environments", Grapp 2007, Barcelona
25. Kayalar C., Balcisoy S., "Seamless Interface Transition Mechanism for Pedestrian Navigation Systems", Mobile and Ubiquitous Information Access 2006 Workshop, Espoo, Finland, September 2006
26. Germen M., Artut S., Ayiter E., Balcisoy S., Sharir Y., "The Representation and Navigation of Complex Data", Education and Research in Computer Aided Architectural Design in Europe, September 2006, Volos, Greece.
27. Ozmen C., Balcisoy S., "3D Spatial Measurement Tools for Digitized Artifacts", Computer Applications and Quantitative Methods in Archaeology 2006, North Dakota, USA
28. Sagiroglu M., Ercil A., Balcisoy S., "Automated Reconstruction of Archaeological Finds", Computer Applications and Quantitative Methods in Archaeology 2006, North Dakota, USA
29. Artut S., Ayiter E., Balcisoy S., M. Germen, Y. Sharir, "Resolving order in chaos: navigation in complex data sets", Toward A Science of Consciousness 2006, Arizona, USA
30. Balcisoy S., Ayiter E., "Virtual Environments for Learners with Special Needs", Poster Proceedings WSCG'2006 Plzen, Czech Republic
31. Sagiroglu M., Ercil A., Ozmen C., Balcisoy S., "Texture Based Approach to Puzzle Assembly", Virtual Retrospect 2005, France
32. Balcisoy S., Ayiter E., "Creating Virtual Environments in a Multidisciplinary Classroom", ACM SIGGRAPH Educators Panel 2005 Los Angeles
33. Sumengen S., Balcisoy S., "Real-Time Simulation of Autonomous Vehicles on Planet-Sized Continuous LOD Terrains", Poster Proceedings WSCG'2005 Plzen, Czech Republic
34. Sumengen S., Balcisoy S., "Hava ve Kara Arac Gruplarının Detaylı Arazi Verisi Üzerinde Gerçek Zamanlı Simülasyonu", Havacılıkta İleri Teknolojiler ve Uygulamalar Sempozyumu; Hava Harp Okulu; December 2004; İstanbul, Turkey (Turkish)
35. Balcisoy S., Kallmann M., Torre R., Fua P., Thalmann D., "Interaction Techniques with Virtual Humans in Mixed Environments", Proc. ISMR 2001, Tokyo, Japan

36. Balcisoy S., Kallmann M., Fua P., Thalmann D., "A framework for rapid evaluation of prototypes with Augmented Reality", Proc. ACM VRST 2000, Seoul, Korea
37. Balcisoy S., Torre R., Ponder M., Fua P., Thalmann D., "Augmented Reality for Real and Virtual Humans", Proc. IEEE CGI 2000. Geneva, Switzerland
38. Torre R., Fua P., Balcisoy S., Ponder M., Thalmann D., "Interaction Between Real and Virtual Humans: Playing Checkers", EGVE 2000, Amsterdam, the Netherlands.
39. Balcisoy S., Sannier G., Magnenat-Thalmann N., Thalmann D., "An Interactive Interface for Directing Virtual Humans", Proc. ISCIS 98, IOS Press, Antalya, Turkey.
40. Balcisoy S., Thalmann D., "Hybrid Approaches to Interactions Between Real and Virtual Humans in Mixed Environments", Proc. Virtual Environments'98, Stuttgart, Germany.
41. Balcisoy S., Thalmann D., "Hybrid Participant Embodiments in Networked Collaborative Virtual Environments", Proc. IEEE Multi Media Modeling'98, Lausanne, Switzerland.
42. Balcisoy S., Thalmann D., "Interaction between Real and Virtual Humans in Augmented Reality", Proc. IEEE Computer Animation'97, Geneva, Switzerland.
43. Emering L, Boulic R., Balcisoy S., Thalmann D., "Multi-Level Modeling and Recognition of Human Actions Involving Full Body Motion", First ACM Conf. On Autonomous Agents'97, Los Angeles, USA.
44. Emering L, Boulic R., Balcisoy S., Thalmann D., "Real-time Interactions with Virtual Agents Driven by Human Action Identification", First ACM Conf. On Autonomous Agents'97, Los Angeles, USA.

#### Other Publications

1. Capin T, Ingrassia M, Balcisoy S., "SVG in 3GPP Multimedia Messaging and Streaming Services", SVG Open 2003, Vancouver, Canada
2. Balcisoy S., "Analysis and Development of Interaction Techniques between Real and Synthetic Worlds." Ph.D. Thesis EPFL, 2001