

# Ugo Erra

## Curriculum Vitae et Studiorum

Università degli Studi della Basilicata

Dipartimento di Matematica, Informatica ed  
Economia

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### Current Position

Assistant Professor at *Dipartimento di Matematica, Informatica ed Economia*, Università degli Studi della Basilicata, Italy.

### Research Interests

**Computer Graphics:** Real Time Rendering, Graphics Simulations.

**Parallel Computing:** GPU Computing, Distributed Computing.

**Information Visualization:** Non-Hierarchical File System, Adaptive User Interfaces, Software Visualization.

### Post-Doctoral Positions

**Post-doctoral Scholarship** received by the Italian Centro Regionale di Competenza at the Università di Salerno, Italy, for a project on the *Development and Technology Transfer of Innovation applied to Cultural and Environmental Heritage*. Period: July 2004 - July 2005.

**Post-doctoral Fellowship** received by the Dipartimento di Informatica ed Applicazioni ‘R.M. Capocelli’ at the Università di Salerno, Italy, for the project *WEB-MINDS: Wide-ScalE, Broadband, Middleware, for Network Distributed Services*. Period: August 2005 - July 2006.

**Post-doctoral Fellowship** received by the Dipartimento di Informatica ed Applicazioni ‘R.M. Capocelli’ at the Università di Salerno, Italy, for a project on the research of *Hardware and Software Technologies for Synchronous Cooperation*. Period: August 2006 - November 2007

### Education

**1993** Technical School “B. Focaccia”, Salerno, Diploma di Perito Capotecnico Informatico.

**2001 Laurea cum laude in Computer Science from the University of Salerno**, Italy.  
Thesis title: *ClusterGL: Libreria per Real Time Ray Tracing. Progettazione ed Implementazione*.

**2004 Ph.D. in Computer Science at the University of Salerno**, Italy. Thesis title:  
*Real-Time Stream Processing using Graphics Hardware.*

## Languages

Italian (mother tongue) and English (fluent)

## Program committee member

International Conference on Information Visualisation (IV) (2007, 2008, 2009, 2010, 2011, 2012, 2013,2014)

IEEE Symposium Series on Computational Intelligence (SSCI) - Symposium on Intelligent Agents IA (2013, 2014)

IEEE Symposium Series on Computational Intelligence (SSCI) - Symposium on Computational Intelligence and Data Mining (2015, 2016)

Workshop (of Euro-Par) on Parallel and Distributed Agent-Based Simulations (PADABS) (2013,2014)

IEEE Congress on Evolutionary Computation (CEC) (2013, 2014)

IEEE World Congress on Computational Intelligence (IEEE WCCI) (2014)

Workshop on Computational Intelligence on Consumer Games and Graphics Hardware (CIGPU) (2012)

ACM Symposium on Applied Computing (SAC) (Multimedia and Visualization Track) (2013, 2014, 2015)

## Journals Referee

IEEE Transactions on Parallel and Distributed Systems, edited by IEEE Computer Society.

Fractals - Complex Geometry, Patterns, and Scaling in Nature and Society, edited by World Scientific Publishing.

Science of Computer Programming, edited by Elsevier.

International Journal of Software Engineering and Knowledge Engineering (IJSEKE), edited by World Scientific Publishing

International Journal of Visual Languages and Computing (JVLC), edited by Elsevier.

Journal of Software: Evolution and Process (JSME), edited by John Wiley & Sons.

Scientific Programming, edited by Hindawi Publishing Corporation.

## Organizing Activity

Head of Computer Graphics and Parallel Computing Laboratory of the Dipartimento di Matematica, Informatica ed Economia, University of Basilicata.

Member of the local organizing committee for the *6th Eurographics Italian Chapter Conference 2008*, Salerno, Italy, 2nd - 4th July 2008.

Member of the organizing committee for the *1st Workshop on Parallel and Distributed Agent-Based Simulations* a satellite Workshop of Euro-Par 2013, Aachen, Germany, Aug. 26th 2013.

Member of the organizing committee for the *2st Workshop on Parallel and Distributed Agent-Based Simulations* a satellite Workshop of Euro-Par 2014, Porto, Portugal, 25-29 August 2014.

Member of the organizing committee for the *3rd Workshop on Parallel and Distributed Agent-Based Simulations* a satellite Workshop of Euro-Par 2015, Vienna, Austria, 24-28 August 2015.

## Teaching Activity

**Algorithms and Data Structures.** Undergraduate computer science course, (2014, 2015, 2016). University of Basilicata - Italy.

**Fundamentals of 3D Computer Graphics.** Graduate computer science course, (2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016). University of Basilicata - Italy.

**Computer Networks.** Undergraduate computer science course, (2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014). University of Basilicata - Italy.

**Introduction to Computer Science** Undergraduate Business Economics course (2014). University of Basilicata - Italy.

**Theoretical Computer Science.** Graduate computer science course, (2005). University of Basilicata - Italy.

**Languages and Compilers.** Graduate computer science course, (2005). University of Basilicata - Italy.

**Operating Systems.** Undergraduate computer science course, (2006, 2007, 2008, 2009). University of Basilicata - Italy.

**Interactive Virtual Environments and Videogames.** Graduate computer science course, (2010, 2011, 2012). University of Salerno - Italy.

**Introduction to the Photorealistic Images Generation.** Ph.D. computer science course, (2008). University of Basilicata - Italy.

**Operating Systems and Network.** Certification course for teaching, (2014). University of Basilicata - Italy.

## Ph.D. Program

Board of Ph.D. Commissioners in Computer Science, University of Salerno - Italy. Years: 2008, 2009, 2010.

Board of Ph.D. Commissioners in International Doctoral Seminar “Pythagoras of Samo”, University of Basilicata - Italy. Years: 2011, 2012, 2013, 2014.

## Ph.D. Advisor

**Giuseppe Caggianese.** Accelerated Simulation of Dynamic Multi-Agent Systems for Environmental Monitoring, Ph.D. Degree Program in Methods and Technologies for Environmental Monitoring. University of Basilicata, 2011-2014.

**Nicola Felice Capece.** Ph.D. Degree Program in “Matematica e Informatica” University of Salento, 2015-.

## Research Projects

Scientific adviser. Basilicata Innovazione - *Laser Scanner 3D model usability for Virtual Reality*. Period: July 2015 - October 2015.

Scientific adviser. Basilicata Innovazione - *Feasibility Study for the development of a 3D showcase shop based on Augmenting Reality*. Period: June 2014 - March 2015.

Scientific adviser. Basilicata Innovazione - *Augmenting Reality for Cultural and Archaeological contents on Smartphone*. Period: September 2010 - August 2011.

Scientific adviser. Basilicata Innovazione - *Virtual Reality for visualization of real world terrain from heightmap data and satellite images*. Period: December 2015 - June 2016.

## Research Support

NVIDIA (TITAN Graphics Board) Academic Hardware Donation on the proposed research *Exploiting GPU Computations for Heuristic Search*. Period: 2013.

NVIDIA (TESLA K20 Accelerator) Academic Hardware Donation on the proposed research *Exploiting GPU Computations for Heuristic Search*. Period: 2016.

## Editors in Proceedings

2008	Vittorio Scarano, Rosario De Chiara, and Ugo Erra, editors. <i>Eurographics Italian Chapter Conference 2008, Salerno, Italy, 2008</i> . Eurographics. ISBN 978-3-905673-68-5
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## Book Chapters

- 2014 | Ugo Erra and Giuseppe Scanniello. *Visualizing the Evolution of Software Systems using the Forest Metaphor*, chapter 7, pages 126–140. Newcastle upon Tyne: Cambridge Scholars Publishing, Information Visualisation - Techniques, Usability & Evaluation edition, 2014. ISBN 978-1-4438-5981-3
- 2010 | Ugo Erra and Giuseppe Caggianese. *Real-time Adaptive GPU multi-agent path planning*, volume 2, chapter 22, pages 295–308. Morgan Kaufmann Publishers Inc., GPU Computing Gems Jade edition, 2011. ISBN 978-0-12-385963-1

## Journals

- 2015 | Giuseppe Scanniello, Ugo Erra, Giuseppe Caggianese, and Carmine Gravino. On the effect of exploiting gpus for a more eco-sustainable lease of life. *International Journal of Software Engineering and Knowledge Engineering*, 25(1):169, 2015
- 2015 | Ugo Erra, Sabrina Senatore, Fernando Minnella, and Giuseppe Caggianese. Approximate TFIDF based on topic extraction from massive message stream using the GPU. *Information Sciences*, 292(0):143 – 161, 2015b. ISSN 0020-0255
- 2014 | Giuseppe Scanniello and Ugo Erra. Distributed modeling of use case diagrams with a method based on think-pair-square: Results from two controlled experiments. *Journal of Visual Languages & Computing*, 25(4):494 – 517, 2014. ISSN 1045-926X
- 2010 | U. Erra and G. Scanniello. Assessing communication media richness in requirements negotiation. *Software, IET*, 4(2):134–148, 2010. ISSN 1751-8806
- 2009 | Gennaro Cordasco, Biagio Cosenza, Rosario De Chiara, Ugo Erra, and Vittorio Scarano. Experiences with Mesh-like computations using Prediction Binary Trees. *Scalable Computing: Practice and Experience, Scientific international journal for parallel and distributed computing (SCPE)*, 10(2):173–187, June 2009b
- 2007 | Ugo Erra, Gennaro Iaccarino, Delfina Malandrino, and Vittorio Scarano. Personalizable edge services for Web accessibility. *Universal Access in the Information Society*, 6(3):285–306, 2007

## Conferences

- 2016 | N. Capece, R. Agatiello, and U. Erra. A client-server framework for the design of geo-location based augmented reality applications. In *2016 20th International Conference Information Visualisation (IV)*, pages 130–135, July 2016. doi: 10.1109/IV.2016.20

- 2015 Ugo Erra and Valerio Colonnese. Experiences in the development of an augmented reality dressing room. In *Augmented and Virtual Reality*, volume 9254 of *Lecture Notes in Computer Science*, pages 467–474. Springer International Publishing, 2015. ISBN 978-3-319-22887-7
- Ugo Erra, Giuseppe Scanniello, and Maria Caulo. Software Systems as Archipelagos of Atolls. In *2015 19th International Conference Information Visualisation, IV '15*, pages 171–176, Los Alamitos, CA, USA, 2015a. IEEE Computer Society
- 2014 Francesco Carotenuto, Ugo Erra, and Vittorio Scarano. Slam map application for tracking lights on car dashboards. In Lucio Tommaso De Paolis and Antonio Mongelli, editors, *Augmented and Virtual Reality*, volume 8853 of *Lecture Notes in Computer Science*, pages 413–420. Springer International Publishing, 2014. ISBN 978-3-319-13968-5
- 2013 Giuseppe Scanniello, Ugo Erra, Giuseppe Caggianese, and Carmine Gravino. Using the GPU to Green an Intensive and Massive Computation System. *2011 15th European Conference on Software Maintenance and Reengineering*, 0:384–387, 2013. ISSN 1534-5351
- Biagio Cosenza, Carsten Dachsbacher, and Ugo Erra. GPU Cost Estimation for Load Balancing in Parallel Ray Tracing. In *International Conference on Computer Graphics Theory and Applications (GRAPP)*, pages 139–151, 2013
- G. Scanniello and U. Erra. Software entities as bird flocks and fish schools. In *Software Visualization (VISSOFT), 2013 First IEEE Working Conference on*, pages 1–4, 2013
- Giuseppe Caggianese and Ugo Erra. Parallel Hierarchical A\* for Multi Agent-Based Simulation on the GPU. In *Euro-Par 2013: Parallel Processing Workshops*, volume 8374 of *Lecture Notes in Computer Science*, pages 513–522. Springer Berlin Heidelberg, 2014. ISBN 978-3-642-54419-4
- 2012 G. Caggianese and U. Erra. Exploiting GPUs for multi-agent path planning on grid maps. In *High Performance Computing and Simulation (HPCS), 2012 International Conference on*, pages 482–488, 2012a
- Ugo Erra, Giuseppe Scanniello, and Nicola Capece. Visualizing the Evolution of Software Systems Using the Forest Metaphor. *2010 14th International Conference Information Visualisation*, 0:87–92, 2012. ISSN 1550-6037
- Ugo Erra and Giuseppe Scanniello. Towards the visualization of software systems as 3D forests: the CodeTrees environment. In *Proceedings of the 27th Annual ACM Symposium on Applied Computing, SAC '12*, pages 981–988, New York, NY, USA, 2012. ACM. ISBN 978-1-4503-0857-1

- Ugo Erra and Bernardino Frola. Frequent Items Mining Acceleration Exploiting Fast Parallel Sorting on the GPU. In *International Conference on Computational Science (ICCS)*, pages 86–95, 2012
- Giuseppe Caggianese and Ugo Erra. GPU Accelerated Multi-agent Path Planning Based on Grid Space Decomposition. In *International Conference on Computational Science (ICCS)*, pages 1847–1856, 2012b
- 2011 Ugo Erra, Bernardino Frola, and Vittorio Scarano. An Interactive Bio-inspired Approach to Clustering and Visualizing Datasets. In *Proceedings of the 2011 15th International Conference on Information Visualisation, IV '11*, pages 440–447, Washington, DC, USA, 2011b. IEEE Computer Society. ISBN 978-0-7695-4476-2
- U. Erra, B. Frola, and V. Scarano. A GPU-based Interactive Bio-inspired Visual Clustering. In *Computational Intelligence and Data Mining (CIDM), 2011 IEEE Symposium on*, pages 268–275, 2011a
- U. Erra and S. Senatore. Fuzzy shape classification exploiting geometrical and moments descriptors. In *Fuzzy Systems (FUZZ), 2011 IEEE International Conference on*, pages 733–740, 2011a
- Ugo Erra and Sabrina Senatore. Hand-Draw Sketching for Image Retrieval through Fuzzy Clustering Techniques. In *19th Italian Symposium on Advanced Database Systems (SEBD)*, pages 413–420, 2011c
- Giuseppe Scanniello and Ugo Erra. A New Method for Cooperatively Modeling High Level Use Case Diagrams in Global Software Development. In *Proceedings of the Conference of the Italian Chapter of AIS (Association for Information Systems, AIS '11, 2011*. ISBN 978-88-6105-063-1
- U. Erra and G. Scanniello. Assessing think-pair-square in distributed modeling of use case diagrams. In *Empirical Requirements Engineering (EmpiRE), 2011 First International Workshop on*, pages 77–84, 2011
- 2010 Ugo Erra, Ana Portnova, and Giuseppe Scanniello. Comparing two communication media in use case modeling: results from a controlled experiment. In *Proceedings of the 2010 ACM-IEEE International Symposium on Empirical Software Engineering and Measurement, ESEM '10*, pages 53:1–53:4, New York, NY, USA, 2010b. ACM. ISBN 978-1-4503-0039-1
- Ugo Erra, Bernardino Frola, and Vittorio Scarano. BehaveRT: A GPU-Based Library for Autonomous Characters. In Ronan Boulic, Yiorgos Chrysanthou, and Taku Komura, editors, *Motion in Games*, volume 6459 of *Lecture Notes in Computer Science*, pages 194–205. Springer Berlin Heidelberg, 2010a. ISBN 978-3-642-16957-1

- Ugo Erra and Sabrina Senatore. Experiences with Shape Classification through Fuzzy c-Means Using Geometrical and Moments Descriptors. In Marcin Detyniecki, Peter Knees, Andreas Nrnberger, Markus Schedl, and Sebastian Stober, editors, *Adaptive Multimedia Retrieval. Context, Exploration, and Fusion*, volume 6817 of *Lecture Notes in Computer Science*, pages 189–203. Springer Berlin Heidelberg, 2011b. ISBN 978-3-642-27168-7
- 2009 G. Cordasco, R. De Chiara, U. Erra, and V. Scarano. Some considerations on the design of a P2P infrastructure for massive simulations. In *Ultra Modern Telecommunications Workshops, 2009. ICUMT '09. International Conference on*, pages 1–7, 2009a
- Ugo Erra and Giuseppe Scanniello. Synchronous Communication Media in the Software Requirements Negotiation Process. In Yuhua Luo, editor, *Cooperative Design, Visualization, and Engineering*, volume 5738 of *Lecture Notes in Computer Science*, pages 245–252. Springer Berlin Heidelberg, 2009. ISBN 978-3-642-04264-5
- U. Erra, B. Frola, V. Scarano, and I. Couzin. An efficient gpu implementation for large scale individual-based simulation of collective behavior. In *High Performance Computational Systems Biology, 2009. HIBI '09. International Workshop on*, pages 51–58, Oct 2009
- 2008 Biagio Cosenza, Gennaro Cordasco, Rosario De Chiara, Ugo Erra, and Vittorio Scarano. On Estimating the Effectiveness of Temporal and Spatial Coherence in Parallel Ray Tracing. In *Eurographics Italian Chapter Conference 2008, Salerno, Italy*, pages 97–104, 2008a
- Biagio Cosenza, Gennaro Cordasco, Rosario De Chiara, Ugo Erra, and Vittorio Scarano. Load Balancing in Mesh-like Computations using Prediction Binary Trees. In *Proceedings of the 2008 International Symposium on Parallel and Distributed Computing, ISPDC '08*, pages 139–146, Washington, DC, USA, 2008b. IEEE Computer Society. ISBN 978-0-7695-3472-5
- Ugo Erra, Vittorio Scarano, and Davide Guida. Fractal Compression Approach for Efficient Interactive Terrain Rendering on the GPU. In *Proceedings of 6th Eurographics Italian Chapter Conference, July 2-4 2008, Salerno (Italy)*, 2008
- 2007 Rosario De Chiara, Ugo Erra, Andrea Petta, Vittorio Scarano, and Luigi Serra. An infrastructure for remote virtual exploration on PDAs. In *Proceedings of the 11th International Conference Information Visualization, IV '07*, pages 813–818, Washington, DC, USA, 2007. IEEE Computer Society. ISBN 0-7695-2900-3
- Rosario De Chiara, Valentina Di Santo, Ugo Erra, and Vittorio Scarano. Real Positioning in Virtual Environments Using Game Engines. In *Eurographics Italian Chapter Conference*, pages 203–208, 2007



- Ilaria Manno, Furio Belgiorno, Rosario De Chiara, Antonio Di Matteo, Ugo Erra, Delfina Malandrino, Giuseppina Palmieri, Donato Pirozzi, and Vittorio Scarano. Collaborative Face2Face Educational Environment (CoFFEE). In *Proceedings of 1st International Conference on Eclipse Technologies (Eclipse-IT), Oct. 4-5 2007, Naples, Italy, 2007*
- 2006 Rosario De Chiara, Ugo Erra, and Vittorio Scarano. An Architecture for Distributed Behavioral Models with GPUs. In *Eurographics Italian Chapter Conference*, pages 197–203, 2006
- Roberto Andreoli, Rosario De Chiara, Ugo Erra, Antonio Iannaccone, Fernando La Greca, and Vittorio Scarano. Some Real Experiences in Developing Virtual Environments. In *Proceedings of the conference on Information Visualization, IV '06*, pages 545–552, Washington, DC, USA, 2006. IEEE Computer Society. ISBN 0-7695-2602-0
- 2005 Roberto Andreoli, Rosario De Chiara, Ugo Erra, and Vittorio Scarano. Interactive 3D Environments by Using Videogame Engines. In *Proceedings of the Ninth International Conference on Information Visualisation, IV '05*, pages 515–520, Washington, DC, USA, 2005. IEEE Computer Society. ISBN 0-7695-2397-8
- Ugo Erra. Toward Real Time Fractal Image Compression Using Graphics Hardware. In George Bebis, Richard Boyle, Darko Koracin, and Bahram Parvin, editors, *Advances in Visual Computing*, volume 3804 of *Lecture Notes in Computer Science*, pages 723–728. Springer Berlin Heidelberg, 2005. ISBN 978-3-540-30750-1
- 2004 Rosario De Chiara, Ugo Erra, Vittorio Scarano, and Maurizio Tatafiore. Massive Simulation using GPU of a Distributed Behavioral Model of a Flock with Obstacle Avoidance. In *Proceedings of the Vision, Modeling, and Visualization Conference 2004 (VMV 2004), November 16-18, 2004, Stanford, California, USA*, pages 233–240. Aka GmbH, 2004
- Rosario De Chiara, Ugo Erra, and Vittorio Scarano. A Visual Adaptive Interface to File Systems. In *Proceedings of the working conference on Advanced visual interfaces, AVI '04*, pages 366–369, New York, NY, USA, 2004. ACM. ISBN 1-58113-867-9
- 2003 R. De Chiara, U. Erra, and V. Scarano. VENNFS: a Venn-diagram file manager. In *Information Visualization, 2003. IV 2003. Proceedings. Seventh International Conference on*, pages 120–125, 2003

**Date**

**Signature**

September 29, 2016

September 29, 2016