

Wolfgang Emmerich

Personal Details

Date of Birth: October 31st, 1965
Place of Birth: Südlohn, Germany
Marital Status: Divorced, one daughter Bianca Emmerich, born 13th April 2003
Residence: 67 Parliament Hill, London NW3 2TB, UK
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Professor of Distributed Computing,
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Education/Qualifications

1998 *Chartered Engineer*, Institution of Electrical Engineers, December 1998.
1990-95 *PhD in Mathematics and Computer Science*, University of Paderborn, Germany. Degree granted in September 1995.
1985-90 *MSc in Computer Science*, University of Dortmund, Germany. Degree granted in July 1990.

Professional History

Employment

2004-present	Professor of Distributed Computing, University of London
2003-04	Reader in Distributed Software Engineering, University of London
2000-03	Senior Lecturer in Computer Science, University College London UK
2000-present	Co-Founder and Chairman Zuhlke Engineering Ltd, London
2000-present	Co-Founder and Partner Zühlke Technology Group AG, Schlieren
1997-2000	Lecturer in Computer Science, University College London UK
1998	Co-Founder Zuhlke Engineering GmbH, Eschborn, Germany
1996-97	Lecturer in Computer Science, City University, London, UK.
1995-96	Visiting Scholar, University of Queensland, Australia (3 months).
1990-95	Research Assistant, University of Dortmund, Germany.
1987-90	Student Assistant, University of Dortmund, Germany.

1 Research

Research Grants as Principal Investigator

I have had externally funded research projects in the amount of approx. GBP 2,500,000. Where projects involve collaboration with other UCL departments or other institutions, the funding of the work in the UCL Computer Science department is for work that I supervise.

2008	European Union. Resources and Services Virtualization without Barriers (RESERVOIR). GBP 201,153. February 2008-January 2010. EPSRC. Understanding Distributed Software Engineering Challenges for the Global Economy. EPSRC. GBP 108,285. January 2008-December 2009.
2007	EPSRC (OMII Managed Programme). OMII-BPEL II. GBP 87,395. March 2007-Feb 2008. BT & EPSRC. Reliability of Service Compositions. GBP 89,863. January 2007-December 2009
2006	European Union. Providing dependable and Adaptive Service Technology for pervasive Information and Communication (PLASTIC). EUR 265,034. February 2006-October 2008. European Union. Pattern-based Architectures for Service Interaction (PARIS). GBP 111,330. March 2006 - February 2008.
2005	EPSRC. The Divergent Grid. GBP 291,078. July 2005-June 2008. Microsoft Research. Impact Analysis of Database Schema Changes. GBP 60,000. June 2005-April 2008.

- 2004** EPSRC. Development of an Open Source Engine for the Business Process Execution Language for the Open Middleware Infrastructure Institute. GBP 248,000. October 2004-March 2006.
- DTI. Federation of Condor pools using Web Services (Co-investigator: John Brodholt, Dept. of Earth Sciences, UCL). GBP 67,000. September 2004-August 2005.
- IBM Faculty Partnership Award (joint with Anthony Finkelstein). USD 40,000. June 2004-May 2005.
- 2003** EPSRC. Establishment of a national OGSA Grid. GBP 210,000. December 2003-December 2004.
- IBM Faculty Partnership Award (joint with Anthony Finkelstein). USD 40,000. June 2003-May 2004.
- 2002** IBM Faculty Partnership Award (joint with Anthony Finkelstein). USD 40,000. June 2002-May 2003.
- European Union. Syntactic and Semantic Integration of Visual Modeling Techniques (SEGRAVIS). Research Training Network. Total project size EUR 1,497,600, funding for UCL-CS: EUR 140,400. October 2002-September 2006.
- EPSRC. Simulation of Complex Materials. Total project size GBP 752,233; funding for UCL-CS: GBP 142,629. Aug 2002-July 2005
- NERC. Environment from the molecular level. April 2002-March 2005. Subcontract from Cambridge University. Total project size GBP 1,678,661; funding for UCL-CS: GBP 132,895.
- European Union. Trusted and QoS Aware Provision of Application Services (TAPAS). Total project size: EUR 2,244,455; funding for UCL-CS EUR 560,442. April 2002-March 2005
- Kodak Europe Ltd. Industrial Studentship (Co-investigator: Cecilia Mascolo). Incentives in Peer-to-Peer Applications. April 2001-March 2004. GBP 75,000
- 2001** Kodak Europe Ltd. Middleware for Active Network Imaging Application Computing (MANIAC). (Co-investigators: Jon Crowcroft and Anthony Finkelstein). April 2001-December 2002. GBP 137,841
- EPSRC and BT Exact Technologies. CASE Studentship. October 2001-September 2004. GBP 50,850
- UBS AG. Industrial Studentship. October 2001-September 2004. GBP 53,210
- EPSRC. Language Engineering Support for Programmable Networks (Promile). (Co-Investigators: Jon Crowcroft and Hermann de Meer). March 2001-February 2003. GBP 191,308
- TCD and Searchspace Ltd & Component-Based Architecture for Transaction Monitoring. October 2001- January 2005. GBP 211,235
- 2000** Zühlke Engineering. PhD Studentship Middleware for Wearables. October 2000-October 2003. GBP 9,000.
- 2000** Zühlke Engineering. PhD Studentship xlinkit. October 2000-October 2003. GBP 9,000.
- 1997** EPSRC. Visiting Research Fellowship for Carlo Montangero. GBP 5,000.

Research Grants as Co-Investigator

- 2002** BBSRC. Structure-based Function prediction with P2P. June 2002-May 2005. Principal Investigator: David Jones. GBP 190,196
- 2001** European Union. Ubiquitous Web Applications. February 2001-December 2002. Principal Investigator: Anthony Finkelstein. EUR 124,870.
- 2000** Teaching Company Directorate. Teaching Company Scheme with Quality Systems & Software Ltd. June 2000-June 2002. Principal Investigator: Anthony Finkelstein. GBP 73,248.
- 1999** Teaching Company Directorate. Teaching Company Scheme 1884 with Searchspace Ltd. February 1999-September 2001. Principal Investigator: Anthony Finkelstein. GBP 88,388.
- Teaching Company Directorate. Teaching Company Scheme 2645 with Unipower Ltd. Principal Investigator: Anthony Finkelstein. GBP 176,776.
- NATS. Review of applicability of formal methods. Principal Investigator: Anthony Finkelstein. GBP 10,700.
- 1996** European Union. Requirements Engineering Network of Excellence. June 1996-May 2000. Awarded. Principal Investigator: Anthony Finkelstein. EUR 833,072

Publications

Most publications are available online at <http://www.cs.ucl.ac.uk/staff/w.emmerich/publications.html>

Books

- [1] W. Emmerich. *Konstruktion von verteilten Objekten*. dpunkt Verlag, Heidelberg, 2003.
- [2] W. Emmerich. *Engineering Distributed Objects*. John Wiley & Sons, Chichester, UK, April 2000.

Edited Books

- [1] R. Bahsoon, L. Capra, W. Emmerich, and M. E. Fayad, editors. *Proc. of the 1st Int. Workshop on Software Architectures and Mobility*. ACM Press, 2008.
- [2] W. Emmerich and G. Rothermel, editors. *Proc. of the 29th Int. Conference on Software Engineering, Minneapolis, USA, May 20-26, 2007*. IEEE Computer Society Press, 2007.
- [3] W. Emmerich and A. L. Wolf, editors. *Component Deployment – Proc. of the 2nd Int. Working Conference, Edinburgh, Scotland, 20-21 May, 2004*, volume 3083 of *Lecture Notes in Computer Science*, Heidelberg, 2004. Springer Verlag.
- [4] W. Emmerich and S. Tai, editors. *Proc. of the 2nd International Workshop on Engineering Distributed Objects, November 2000, Davis, California*, volume 1999 of *Lecture Notes in Computer Science*, Heidelberg, 2001. Springer Verlag.
- [5] W. Emmerich and V. Gruhn, editors. *Proc. of the ICSE 99 Workshop on Engineering Distributed Objects, May 1999, Los Angeles, California, 1999*.

Journal Articles

- [1] B. Rochwerger, D. Breitgand, E. Levy, A. Galis, K. Nagin, L. Llorente, R. Montero, Y. Wolfsthal, E. Elmroth, J. Caceres, M. Ben-Yehuda, W. Emmerich, and F. Galan. The RESERVOIR Model and Architecture for Open Federated Cloud Computing. *IBM Systems Journal*, 2009. To appear.
- [2] J. Skene, F. Raimondi, and W. Emmerich. Service-Level Agreements for Electronic Services. *IEEE Transactions on Software Engineering*, 2009. To appear.
- [3] C Zirpins and W. Emmerich. A reference model of virtual service production networks. *Int. Journal on Service Oriented Computing and Applications*, 2(2-3):145-166, 2008.
- [4] W. Emmerich, J. Sventek, and M. Aoyama. The Impact of Research on the Development of Middleware Technology. *ACM Transactions on Software Engineering and Methodology*, 17(4):48 pages, August 2008.
- [5] W. Emmerich, M. Aoyama, and J. Sventek. The Impact of Research on Middleware Technology. *ACM SIGSOFT Software Engineering Notes*, 32(1):21-46, January 2007. Also published in *ACM SIGOPS Operating Systems Review* 41(1):89-112. 2007.
- [6] S. Zachariadis, C. Mascolo, and W. Emmerich. The SATIN Component System - A Meta Model For Engineering Adaptable Mobile Systems. *IEEE Transactions on Software Engineering*, 32(11):910-927, November 2006.
- [7] P. Brebner and W. Emmerich. Two Ways to Grid: The contribution of Open Grid Services Architecture (OGSA) mechanisms to Service-centric and Resource-centric lifecycles. *Journal of Grid Computing*, 4(1):115-131, March 2006.
- [8] M. Calleja, R. Bruin, M. G. Tucker, M. T. Dover, R. Tyer, L. Blanshard, K. Kleese van Dam, R. J. Allen, C. Chapman, W. Emmerich, P. Wilson, J. Brodholt, A. Thandavan, and V. N. Alexandrov. Collaborative grid infrastructure for molecular simulations: The eMinerals minigrid as a prototype integrated compute and data grid. *Molecular Simulation*, 31(5):303-313, April 2005.
- [9] W. Emmerich, B. Butchart, L. Chen, B. Wassermann, and S. L. Price. Grid Service Orchestration using the Business Process Execution Language (BPEL). *Journal of Grid Computing*, 3(3-4):283-304, 2005.
- [10] R. Bahsoon, W. Emmerich, and J. Macke. Using real options to select stable middleware-induced software architectures. *IEE Proceedings Software*, 152(4):167-186, AUG 2005.
- [11] C. Mascolo, W. Emmerich, and A. Finkelstein. Guest Editorial: XML and Software Engineering. *Automated Software Engineering*, 10(1):5-6, January 2003.
- [12] C. Nentwich, W. Emmerich, A. Finkelstein, and E. Ellmer. Flexible Consistency Checking. *ACM Transactions on Software Engineering and Methodology*, 12(1):28-63, 2003.
- [13] L. Capra, W. Emmerich, and C. Mascolo. CARISMA: Context-Aware Reflective mIddleware System for Mobile Applications. *IEEE Transactions on Software Engineering*, 29(10):929-945, 2003.
- [14] A. Hughes and W. Emmerich. Using programmable network management techniques to establish experimental network testbeds. *BT Technology Journal*, 21(2):195-203, 2003. Kluwer Academic Publishers.
- [15] J. Skene and W. Emmerich. Model Driven Performance Analysis of Enterprise Information Systems. *Electronic Notes in Theoretical Computer Science*, 82(6), April 2003.
- [16] C. Nentwich, L. Capra, W. Emmerich, and A. Finkelstein. xlinkit: A Consistency Checking and Smart Link Generation Service. *ACM Transactions on Internet Technology*, 2(2):151-185, 2002.
- [17] C. Mascolo, L. Capra, S. Zachariadis, and W. Emmerich. XMIDDLE: A Data-Sharing Middleware for Mobile Computing. *Wireless Personal Communications*, 21:77-103, 2002.
- [18] C. Mascolo, L. Zanolin, and W. Emmerich. XMILE: an XML based Approach for Incremental Code Mobility and Update. *Automated Software Engineering*, 9(2):151-165, 2002.

- [19] L. Capra, G. Blair, C. Mascolo, W. Emmerich, and P. Grace. Exploiting Reflection in Mobile Computing Middleware. *ACM Mobile Computing and Communications Review*, 6(4):34–44, 2002.
- [20] C. Nentwich, W. Emmerich, A. Finkelstein, and A. Zisman. BOX: Browsing Objects in XML. *Software Practice and Experience*, 30(15):1661–1676, 2000.
- [21] W. Emmerich, A. Finkelstein, C. Montangero, S. Antonelli, S. Armitage, and R. Stevens. Managing Standards Compliance. *IEEE Transactions on Software Engineering*, 25(6):836–851, 1999.
- [22] W. Emmerich and P. Sawyer. Guest Editor’s Introduction to the Special Issue on the Conference on European Industrial Requirements Engineering. *Requirements Engineering Journal*, 3(2):71–72, 1998.
- [23] W. Emmerich, J. Arlow, J. Madec, and M. Phoenix. Tool Construction for the British Airways SEE with the O₂ ODBMS. *Theory and Practice of Object Systems*, 3(3):213–231, 1997.
- [24] J. Arlow, S. Bandinelli, W. Emmerich, and L. Lavazza. Fine grained Process Modelling: An Experiment at British Airways. *Software Process – Improvement and Practice*, 3(2):105–131, 1997.
- [25] W. Emmerich, F. Ferrandina, and J. Arlow. The OMG CORBAServices - An Overview (in German). *Objekt Spektrum*, pages 46–56, Nov/Dec 1996.
- [26] W. Emmerich, F. Ferrandina, and A. Vogel. Integration of Java and CORBA:Portable Client/Server-Applications in the Internet (in German). *Objekt Spektrum*, pages 62–65, Jul/Aug 1996.
- [27] G. Spanoudakis, A. Finkelstein, and W. Emmerich. Viewpoints 96: International workshop on multiple perspectives in software development. *ACM SIGSOFT Software Engineering Notes*, 22(1):39–41, 1996.

Papers In Peer-Reviewed Proceedings and Edited Books

- [1] F. Raimondi, J. Skene, and W. Emmerich. Efficient Online Monitoring of Web-Service SLAs. In *Proc. of the 16th ACM SIGSOFT International Symposium on Foundations of Software Engineering, Atlanta, USA*, pages 170–180. ACM Press, 2008. ACM SIGSOFT Distinguished Paper Award.
- [2] C. Zirpins and W. Emmerich. An E-Service SOA Model for Virtual Service Enterprises. In *Proc. PROVE ’08, 9th IFIP Working Conference on Virtual Enterprises, Poznan, Poland*, pages 485–492. Springer, 2008.
- [3] R. Bahsoon and W. Emmerich. An Example on Realizing Economics-Driven Software Mining. In *Proc. of the 20th Int. Conference on Software Engineering and Knowledge Engineering, San Francisco, USA*, pages 375–381. Knowledge Systems Institute, July 2008.
- [4] R. Bahsoon, L. Capra, W. Emmerich, and M. E. Fayad. The International Workshop on Software Architectures and Mobility (SAM 2008) - Workshop Summary. In *Companion Volume of the 30th International Conference on Software Engineering*, pages 1033–1034, Leipzig, Germany, May 2008.
- [5] A. Maule, W. Emmerich, and D. S. Rosenblum. Impact Analysis of Database Schema Changes. In *Proc. of the 30th Int. Conference on Software Engineering, Leipzig, Germany*, pages 451–460. ACM Press, 2008.
- [6] R. Bahsoon and W. Emmerich. An Economics-Driven Approach for Valuing Scalability in Distributed Architectures. In *Proc. of the 7th Working IEEE/IFIP Conference on Software Architecture (WICSA 2008), Vancouver, Canada*, pages 9–18. IEEE Computer Society Press, 2008.
- [7] H. Foster, W. Emmerich, J. Kramer, J. Magee, D. Rosenblum, and S. Uchitel. Model checking service compositions under resource constraints. In *Proc. of the 6th joint meeting of the European Software Engineering Conference and the ACM SIGSOFT Symposium on the Foundations of Software Engineering*, pages 225–234. ACM Press, 2007.
- [8] C. Chapman, M. Musolesi, W. Emmerich, and C. Mascolo. Predictive Resource Scheduling in Computational Grids. In *Proc. of the 21st Int. Parallel and Distributed Processing Symposium, Long Beach, CA*, pages 1–10. IEEE Computer Society Press, March 2007.

- [9] J. Skene, A. Skene, J. Crampton, and W. Emmerich. The Monitorability of Service-Level Agreements for Application-Service Provision. In *Proc. of the 6th Int. Workshop on Software and Performance (WOSP), Buenos Aires, Argentina*, pages 3–14. ACM Press, February 2007.
- [10] B. Wassermann, W. Emmerich, B. Butchart, N. Cameron, L. Chen, and J. Patel. Sedna: A BPEL-based environment for visual scientific workflow modelling. In I. J. Taylor, E. Deelman, D. B. Gannon, and M. Shields, editors, *Workflows for e-Science*, chapter 26, pages 428–449. Springer, February 2007.
- [11] B. Wassermann and W. Emmerich. Reliable Scientific Service Compositions. In *Workshop Proceedings of the 4th Int. Conf. on Service Oriented Computing (ICSOC 2006), Chicago, IL*, volume 4652 of *Lecture Notes in Computer Science*, pages 14–25. Springer Verlag, 2007.
- [12] S. Zachariadis, M. Lad, C. Mascolo, and W. Emmerich. Building adaptable mobile middleware services using logical mobility techniques. In B. Kraemer, editor, *Contributions to Ubiquitous Computing*, volume 42 of *Studies in Computational Intelligence*, pages 17–40. Springer, 2006.
- [13] J. Skene and W. Emmerich. Specifications, not Meta-Models. In *Proc. of the ICSE 2006 Workshop on Global integrated Model Management (GaMMa 2006)*, pages 47–54. ACM Press, 2006.
- [14] A. Bertolino, W. Emmerich, P. Inverardi, and V. Issarny. Softure: Adaptable, Reliable and Performing Software for the Future. In T. Margaria-Steffen, editor, *Proc. of the ETAPS '06 Workshop on Future Research Challenges for Software and Services*, 2006.
- [15] L. Chen, B. Wassermann, W. Emmerich, and H. Foster. Web Service Orchestrations with BPEL (Tutorial Summary). In *Proc. of the 28th Int. Conference on Software Engineering, Shanghai, China*, pages 1071–1072. ACM Press, 2006.
- [16] R. Bahsoon and W. Emmerich. Requirements for evaluating architectural stability. In *Proc. of the ACS/IEEE International Conference on Computer Systems and Applications, Dubai, UAE*. IEEE Computer Society Press, 2006.
- [17] R. Bahsoon and W. Emmerich. Architectural stability and middleware: An architecture centric evolution perspective. In *Proc. of the ECOOP 2006 workshop on Architecture-Centric Evolution, Nantes, France*, 2006.
- [18] A. Finkelstein, J. Lewis-Bowen, G. Piccinelli, and W. Emmerich. Using Event Models in Grid Design. In J. Cunha and O. Rana, editors, *Grid Computing: Software Environments and Tools*, pages 19–44. Springer, 2006.
- [19] P. Brebner and W. Emmerich. Deployment of Infrastructure and Services in the Open Grid Services Architecture. In A. Dearle and S. Eisenbach, editors, *Proc. of the 3rd Int. Working Conference on Component Deployment, CD 2005, Grenoble, France*, volume 3798 of *Lecture Notes in Computer Science*, pages 181–195. Springer, NOV 2005.
- [20] C. Goonatilake, C. Chapman, W. Emmerich, M. Farrellee, T. Tannenbaum, M. Livny, M. Calleja, and M. Dove. Condor birdbath - web service interface to condor. In *Proc. of the 2005 UK e-Science All Hands Meeting*. EPSRC, SEP 2005.
- [21] J. Skene and W. Emmerich. Engineering Runtime Requirements-Monitoring Systems using MDA Technologies. In *IFIP Symposium on Trustworthy Global Computing*, volume 3705 of *Lecture Notes in Computer Science*, pages 319–333. Springer, 2005.
- [22] L. Duboc, T. Wicks, and W. Emmerich. Experience with Lightweight Distributed Component Technologies in Business Intelligence Systems. In C. Mascolo and T. Gschwind, editors, *Proc. of the 4th Int. Workshop on Software Engineering and Middleware, Linz, Austria*, volume 3437 of *Lecture Notes in Computer Science*. Springer, March 2005.
- [23] G. Denaro, A. Polini, and W. Emmerich. Performance Testing of Distributed Component Architectures. In S. Beydeda and V. Gruhn, editors, *Building Quality into COTS Components – Testing and Debugging*, pages 294–314. Springer, 2005.

- [24] S. Zachariadis, C. Mascolo, and W. Emmerich. SATIN: A Component Model for Mobile Self-Organisation. In R. Meersman and Z. Tari et al., editors, *On the Move to Meaningful Internet Systems 2004: Proc. of CoopIS, DOA and ODBASE, Agia Napa, Cyprus*, volume 3291 of *Lecture Notes in Computer Science*, pages 1303–1321. Springer, Agia Napa, Cyprus, October 2004.
- [25] G. Rodrigues, G. Roberts, and W. Emmerich. Reliability Support for the Model Driven Architecture. In R. de Lemos, C. Gacek, and A. Romanovsky, editors, *Architecting Dependable Systems II*, volume 3069 of *Lecture Notes in Computer Science*, pages 79–98. Springer, 2004.
- [26] C. Chapman, P. Wilson, T. Tannenbaum, M. Farrellee, M. Livny, J. Brodholt, and W. Emmerich. Condor Services for the Global Grid: Interoperability between Condor and OGSA. In S. Cox, editor, *Proc of the 2004 UK E-Science All Hands Meeting, Nottingham*, pages 870–877. UK Engineering and Physical Science Research Council, 2004.
- [27] M. Calleja, L. Blanshard, R. Bruin, C. Chapman, A. Thandavan, R. Tyer, P. Wilson, V. Alexandrof, J. Brodholt, M. T. Dove, W. Emmerich, and K. Kleese van Dam. Grid tool integration within the eMinerals Project. In S. Cox, editor, *Proc of the 2004 UK E-Science All Hands Meeting, Nottingham*, pages 812–817. UK Engineering and Physical Science Research Council, 2004.
- [28] P. Wilson, W. Emmerich, and J. Brodholt. Leveraging HTC for UK eScience with Very Large Condor pools: Demand for transforming untapped power into results. In S. Cox, editor, *Proc of the 2004 UK E-Science All Hands Meeting, Nottingham*, pages 308–315. UK Engineering and Physical Science Research Council, 2004.
- [29] H. Nowell, B. Butchart, D. S. Coombes, S. L. Price, W. Emmerich, and C. R. A. Catlow. Increasing the Scope for Polymorph Prediction using e-Science. In S. Cox, editor, *Proc of the 2004 UK E-Science All Hands Meeting, Nottingham*, pages 968–971. UK Engineering and Physical Science Research Council, 2004.
- [30] J. Skene and W. Emmerich. Generating a Contract Checker for an SLA Language. In *Proc. of the EDOC 2004 Workshop on Contract Architectures and Languages, Monterey, California*. IEEE Computer Society Press, 2004.
- [31] R. Bahsoon and W. Emmerich. Evaluating architectural stability with real options theory. In *Proc. of the 20th Int. Conference on Software Maintenance, Chicago, Illinois, U.S.A.*, pages 443–447. IEEE Computer Society Press, 2004.
- [32] C. Mascolo, L. Capra, and W. Emmerich. Principles of Mobile Computing Middleware. In Q. Mahmoud, editor, *Middleware for Communications*, pages 261–280. John Wiley, 2004.
- [33] J.-M. Jezequel and W. Emmerich. MDA in Practice (Panel). In *Proc. of the 26th Int. Conference on Software Engineering, Edinburgh, UK*, page 691. IEEE Computer Society Press, May 2004.
- [34] R. Bahsoon and W. Emmerich. Applying ArchOptions to Value the Payoff of Refactoring. In *Proc. of the 6th Int. Workshop on Economics Driven Software Engineering Research, Edinburgh, Scotland*, pages 66–70, Six Hills Way, Stevenage, Herts, SG1 2AY, UK, 2004. IEE.
- [35] J. Skene, D. Lamanna, and W. Emmerich. Precise Service Level Agreements. In *Proc. of the 26th Int. Conference on Software Engineering, Edinburgh, UK*, pages 179–188. IEEE Computer Society Press, May 2004.
- [36] G. Denaro, A. Polini, and W. Emmerich. Early Performance Testing of Distributed Software Applications. In *Proc. of the 4th Int. Workshop on Software and Performance, Redwood Shores, Cal., January 14-16, 2004*, pages 94–103. ACM Press, 2004.
- [37] G. Rodrigues, D. Rosenblum, and W. Emmerich. A model driven approach for software systems reliability. In *Proc. of the 26th Int. Conference on Software Engineering, Edinburgh, UK*, pages 30–32. IEEE Computer Society Press, May 2004.

- [38] G. Piccinelli, W. Emmerich, S. Williams, and M. Stearns. A Model-Driven Architecture for Electronic Service Management Systems. In M. E. Orlowska, S. Weerawarana, M. P. Papazoglou, and J. Yang, editors, *Proc. of the 1st Int. Conference on Service-Oriented Computing, Trento, Italy*, volume 2910 of *Lecture Notes in Computer Science*, pages 241–255. Springer Verlag, 2003.
- [39] G. N. Rodrigues, G. Roberts, W. Emmerich, and J. Skene. Reliability Support for the Model Driven Architecture. In *Proceedings of the ICSE Workshop on Software Architecture for Dependable Systems*, 2003.
- [40] J. Skene and W. Emmerich. A Model Driven Architecture Approach to Analysis of Non-Functional Properties of Software Architectures. In *Proc. of the 18th IEEE Conference on Automated Software Engineering, October 2003, Montreal, Canada*, pages 236–239. IEEE Computer Society Press, 2003.
- [41] R. Bahsoon and W. Emmerich. ArchOptions: A Real Options–Based Model for Predicting the Stability of Software Architectures. In *Proc. of the ICSE 2003 Workshop on Economics–Driven Software Engineering Research, Portland, Oregon*, 2003.
- [42] D. Dui and W. Emmerich. Compatibility of XML Language Versions. In B. Westfechtel and A. v. d. Hoek, editors, *Software Configuration Management. Selected Papers of ICSE Workshops SCM 2001 and SCM 2003*, volume 2649 of *Lecture Notes in Computer Science*, pages 148–162. Springer Verlag, 2003.
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- [44] C. Nentwich, W. Emmerich, and A. Finkelstein. Consistency Management with Repair Actions. In *Proc. of the 25th Int. Conference on Software Engineering, Portland, Oregon*, pages 455–464. ACM Press, 2003.
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- [47] S. Zachariadis, C. Mascolo, and W. Emmerich. Adaptable Mobile Applications: Exploiting Logical Mobility in Mobile Computing. In E. Horlait, T. Magedanz, and R. H. Glitho, editors, *Proceedings of 5th Int. Workshop on Mobile Agents for Telecommunication Applications (MATA03)*, volume 2881 of *Lecture Notes in Computer Science*, pages 170–179. Springer Verlag, October 2003.
- [48] R. Bahsoon and W. Emmerich. Evaluating software architectures for development, stability and evolution. In *Proc. of the ACS/IEEE International Conference on Computer Systems and Applications, Tunis, Tunisia*, page 47. IEEE Computer Society Press, 2003.
- [49] L. Capra, W. Emmerich, and C. Mascolo. A Micro–Economic Approach to Conflict Resolution in Mobile Computing. In *Proc. of the 10th ACM SIGSOFT Foundations of Software Engineering Conference*, pages 31–40. ACM Press, 2002.
- [50] G. Piccinelli, W. Emmerich, C. Zirpins, and K. Schuett. Web Services Interfaces for Inter-organizational Business Process: An Infrastructure for Automated Reconciliation. In *Proc. of the 6th IEEE Int. Conference on Enterprise Distributed Object Computing, Lausanne*, pages 285–292. IEEE Computer Society Press, 2002.
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Theses

- [1] W. Emmerich. *Tool Construction for process-centred Software Development Environments based on Object Database Systems*. PhD thesis, University of Paderborn, Germany, 1995.
- [2] W. Emmerich. *Semantics and Analysis of FUNSOFT Nets Supporting Software Process Modelling (In German)*. Msc thesis, University of Dortmund, Department of Computer Science, 1990.

Invited Talks and Panels

In addition to a large number of invited talks at universities and industrial research centres, I have been invited to give talks and participate as leading discussant in panels at the following international meetings.

- 2008** The History of Middleware. Invited Talk, 30th Int. Conference on Software Engineering, Leipzig, Germany
Managing Web Service Quality. Distinguished Lecture. Brenn School of Computer Science, University of California, Irvine. February 2008.
- 2007** Panel on Impact of Research on Middleware Technology. 29th Int. Conference on Software Engineering, Minneapolis, USA. May 2007.
Dependability of Web Service Architectures. Keynote Address. Track on Architecting Dependable Systems. The 37th Annual IEEE/IFIP International Conference on Dependable Systems and Networks, Edinburgh, UK
- 2004** Panel on Model Driven Architecture. 26th Int. Conference on Software Engineering, Edinburgh, Scotland. May 2004.
Organisation and Moderation of Management Track at OOP. Munich, January 2004.
- 2003** Moderation of Management Track at OOP. Munich, January 2003.
- 2002** XML Validation. Invited Talk at the ISDA FpML Conference. New York. November 2002
Distributed Component Technologies and their Software Engineering Implications. Invited Talk at the IEEE/ACM 24th Int. Conference on Software Engineering, Orlando, Florida May 2002
- 2001** Panel on XML and Software Engineering with A. Finkelstein and E. Ellmer. 9th ACM SIGSOFT Conference, Vienna, Austria. September 2001
Panel on Bachelor and Master Degrees in Software Engineering with D. Parnas, J. Ludewig, H. Bartsch. GI working conference on Software Engineering Education (SEUH 2001). Zurich, Switzerland. February 2001.
- 2000** Software Engineering and Middleware: A Roadmap. Invited Talk at the 22nd Int. Conference on Software Engineering, Limerick, Ireland. May 2000.
- 1999** An Overview of Component Technologies. Invited tutorial at the 14th IEEE Int. Conference on Automated Software Engineering. Grenoble, France. September 1999.
- 1998** A comparative analysis of development and run-time environment for business objects. Invited Talk GI Workshop on Integration of heterogeneous Information Systems. Magdeburg, Germany. June 1998.
- 1997** Software Process Improvement through Standards. Invited talk at the Software Process Improvement conference. Barcelona, Spain November 1997
Software Process - Standards, Assessments and Improvements. Promoter Summer School. Grenoble, France. September 1997.

Academic Supervision

The following research students have completed their PhD under my supervision:

Date	Name	Topic
10/2000-01/2005	Dr. Christian Nentwich	Managing the Consistency of Distributed Documents.
10/2000-09/2003	Dr. Licia Capra	Reflective Mobile Middleware for Context-Aware Applications.
10/2001-01/2005	Dr. Rami Bahsoon	Evaluating Architectural Stability with Real Options Theory.
10/2002-10/2007 (part-time)	Dr. James Skene	Language support for service-level agreements for application-service provision.

I am currently supervising the following PhD Students:

Date	Name	Topic
1/2007-present	Bruno Wassermann	Reliability of Service Compositions.
10/2002-present	Clovis Chapman	Resource allocation and scheduling in de-centralised computational grids.
09/2006-present	Andrew Maule	Change Impact Analysis of Relational Database Schema Updates
04/2002-present	Torsten Ackemann	Incentives in peer-to-peer networks.
10/1999-present	Nima Kaveh	Model checking distributed objects.

I am or have been supervising the following research staff:

Date	Name	Current Affiliation
09/04-08/05	Charaka Goonatilake	PhD Student, University of Cambridge
12/03-12/04	Paul Brebner	Researcher, NICTA, Canberra, Australia
10/03-03/05	Dr. Licia Capra	Lecturer, UCL-CS
03/03-01/05	Leticia Duboc	PhD Student, UCL-CS
01/03-08/03	Dr. Giovanni Denaro	Ricercatore, Universita Milano Bicocca
09/02-present	James Skene	UCL-CS
01/02-09/03	Davide Lamanna	PhD Student, Universita La Sapienza, Rome
10/02-03/03	Kenneth Lu	MIT
10/01-09/03	David Martin	Syntegra
09/02-04/06	Ben Butchart	University of Edinburgh
11/02-present	Clovis Chapman	UCL-CS
04/01-03/03	Nicola Pezzi	UCL-High Energy Physics
06/02-11/02	Mirco Musolesi	Post-Doc, Dartmouth College
07/01-03/02	Luca Zanolin	Google
04/01-10/02	Dr. Miguel Rio	Lecturer, UCL-Electrical Engineering
06/98-05/00	Kam Sanmugalingam	PhD Student, Cambridge University
10/99-09/01	Nicola Harris	Searchspace Ltd
08/98-07/00	Dr. Anthony Briggishaw	T-Motion Plc

2 Knowledge Transfer

Entrepreneurship

In October 1998, I co-founded Zühlke Engineering GmbH, Eschborn, Germany (<http://www.zuehlke.com>). In 2000, I co-founded Zuhlke Engineering Ltd in London of which I am a Director and Principal Consultant and in 2000, I co-founded the Zuhlke Technology Group (<http://www.zuhlke.com>). In 2007, the Zuhlke Technology Group had net revenue of approx. 31 MGBP. As of 30th April 2008, the Zuhlke Technology Group employs 320 staff.

I am a co-founder and was a Director of Systemwire, a UCL spin-out company that builds consistency management and validation tools for semi-structured documents. Systemwire was acquired in a trade sale by Message Automation Ltd in 2006.

Consulting

Between November 1995 and October 1998, I had a consultancy agreement with LogOn Technology Transfer, the OMG representative for Central Europe. Since 1998 I have consulted on behalf of Zuhlke Technology Group companies. I have achieved direct technology transfer through a number of consulting assignments by the following companies:

2007	HSBC Investment Bank, London, UK
2006	Covington and Burlington, Brussels, UK
2006	Cromwell and Sullivan, New York, USA
2003	M & G Investments Limited, London, UK
2003	Credit Suisse First Boston, London, UK
2002	Aerosystems, Yeoville, UK
2002	UBS Global Asset Management, Zurich, Switzerland
2000-2001	JP Morgan Investment Management Inc, London, UK
1998-1999	National Air Traffic Services, London, UK
1998-2000	Deutsche Genossenschaftsbank, Frankfurt, Germany
1999,2001,2003	British Airways, London, UK
1999	Swiss Life, Zürich, Switzerland
1996-97	Mannesmann Datenverarbeitung (now Vodafone D2), Ratingen, Germany

3 Teaching

Year	Subject	Code	Hours	No of Students
2007/08	Tools and Environments	GS04/COMP4024	30	35
	Network Application Programming	GZ04	15	20
2006/07	Sabbatical			
2005/06	Advanced Software Engineering	COMP3C05	30	35
	Distributed Systems	Z22/COMP4C40	15	65
	Distributed Application Programming	Z23	15	32
2004/05	Advanced Software Engineering	COMP3C05	30	35
	Distributed Systems	Z22/COMP4C40	15	65
	Distributed Application Programming	Z23	15	32
2003/04	Advanced Software Engineering	COMP3C05	30	35
	Distributed Systems	Z22/COMP4C40	15	65
	Distributed Application Programming	Z23	15	32
2002/03	Concurrency	COMP3C03	30	55
	Advanced Software Engineering	COMP3C05	30	35
	Distributed Systems	Z07/COMP4C39	15	28
2001/02	Concurrency	COMP3C03	30	50
	Advanced Software Engineering	COMP3C05	30	25
	Distributed Systems	Z07/COMP4C39	15	18
2000/01	Concurrency	COMP3C03	30	55
	Software Engineering	Z01	15	16
	Protocol Specification	Z02	9	16
	Distributed Systems for Communications	ELEC	30	20
1999/00	Concurrency	COMP3C03	30	45
	Software Engineering	Z01	15	16
	Protocol Specification	Z02	9	16
	Distributed Systems for Communications	ELEC	30	20
1998/99	Concurrency	COMPC340	30	50
	Software Engineering	Z01	15	16
	Distributed Systems for Communications	ELEC	30	20
1997/98	Concurrency	COMPC340	15	40
	Distributed Systems for Communications	ELEC	30	20

4 Enabling Activity

Administrative Duties

2005-present	Director of Research and Deputy Head of Department, UCL
2002-2005	Undergraduate Admissions Tutor, Dept. of Computer Science, UCL
2001-2004	Member of the Grid Executive Board, UCL.
1997-2002	Chairman Technical Services Committee, Dept. of Computer Science, UCL.
1997	Manager Technical Services Group, School of Informatics, City University.
1996-97	Editor of Computer Science Technical Report Series, Dept. of Computer Science, City University.
1994	Member of the Recruitment Committee for the Chair for Software Engineering, University of Dortmund.
1994	Member of the Recruitment Committee for the Chair for Information Systems, University of Dortmund.
1993-95	Teaching Assistant Representative on the Departmental Committee, University of Dortmund.

Professional Service

For Professional Societies

2005-present	Editorial Board for Transactions of Software Engineering.
2003-2005	UK E-Science Programme. Member of the National Architecture Task Force.
2003-2005	UK E-Science Programme. Member of the OMII Technical Advisory Board.
2002	Institution of Electrical Engineers. Programme Chair. Vacation School on Building Distributed Software Architectures using Middleware.
1998-present	Institution of Electrical Engineers. Member of the Executive Board of the e-Infrastructure Professional Network.
1998-2003	British Computer Society. Secretary of the Requirements Engineering Specialist Group.
1999	Institution of Electrical Engineers. Programme Co-Chair Residential Courses on Engineering Distributed Objects.
1996-1998	Member IEE Professional Group A4 (Distributed Systems Engineering).

Journals

2002	W. Emmerich and D. Wile, Guest Editors. Special Issue on ASE 2002. To appear in Automated Software Engineering. Kluwer 2005.
2001	C. Mascolo, W. Emmerich and A. Finkelstein, Guest Editors. Special Issue on ICSE Workshop on XML and Software Engineering. Automated Software Engineering. Kluwer. 2002.
1999	P. Sawyer and W. Emmerich, Guest Editors. <i>Special Issue on the Conference on European Industrial Requirements Engineering (CEIRE 98)</i> . Requirements Engineering Journal 3(2):71-72. Springer Verlag. 1998.

Conference and Workshop Organization

- 2011 W. Emmerich and Matt Dwyer. Workshop Co-Chairs. *33rd Int. Conference on Software Engineering*, Hawaii, USA. 2011.
- 2008 W. Emmerich and J. Bishop. Tutorial Co-Chairs. *30th Int. Conference on Software Engineering*, Leipzig, Germany, May 2008
- 2007 W. Emmerich and G. Rothermell. PC Co-Chairs. *29th Int. Conference on Software Engineering*, St. Louis, Missouri, May 2007
- 2005 W. Emmerich. Doctoral Symposium Chair. *5th Joint Meeting of the European Software Engineering Conference and the Symposium on Foundations of Software Engineering*, Lisbon, Portugal, September 2005
- W. Emmerich and D. Rosenblum. Co-Chairs for Industrial Experience Report Track. *27th Int. Conference on Software Engineering*, St. Louis, MO. USA.
- 2004 W. Emmerich and A. Wolf. PC Co-Chairs. *2nd ACM Working Conference on Component Deployment*, Edinburgh, UK. May 2004.
- 2002 W. Emmerich and D. Wile. PC Co-Chairs. *17th IEEE Int. Conference on Automated Software Engineering*, Edinburgh, UK. September 2002
- W. Emmerich. General Chair. *3rd Int. Workshop on Software Engineering and Middleware*, Orlando, Florida, May 2002
- 2001 C. Mascolo, W. Emmerich and A. Finkelstein. Organizers. ICSE 2001 Workshop on XML and Software Engineering.
- 2000 S. Tai and W. Emmerich, Programme Co-Chairs, *2nd Int. Workshop on Engineering Distributed Objects*, Davis, CA. November.
- 2000 W. Emmerich and D. Rosenblum, Research-Demonstration and Posters Co-Chairs, *22nd Int. Conference on Software Engineering*, Limerick, Ireland. June.
- 1999 W. Emmerich and V. Gruhn, Co-Chairs, *Workshop on Engineering Distributed Objects* organized in conjunction with the *21st Int. Conference on Software Engineering*, Los Angeles, CA. May.
- 1998 W. Emmerich, General Chair *BCS Conference on European Industrial Requirements Engineering*. London, UK. November.

Membership in Programme Committees

2009	31 st <i>Int. Conference on Software Engineering</i> , Vancouver, Canada
2008	23 rd <i>Automated Software Engineering Conference</i> , L'Aquila, Italy 1 st <i>Indian Software Engineering Conference</i> , Hyderabad, India
2007	23 rd <i>Automated Software Engineering Conference</i> , Atlanta, USA 29 th <i>Int. Conference on Software Engineering</i> , Minneapolis, USA
2006	4 th <i>Int. Conference on Service-Oriented Computing</i> , Chicago, USA 28 th <i>Int. Conference on Software Engineering</i> , Shanghai, China
2005	5 th <i>Joint Meeting of the European Software Engineering Conference and the Symposium on Foundations of Software Engineering</i> , Lisbon, Portugal 8 th <i>SIGSOFT Symposium on Component Based Software Engineering</i> , St. Louis, Missouri <i>Distributed Objects and Applications 2005</i> , Cyprus 20 th <i>IEEE Int. Conference on Automated Software Engineering</i> , Linz, Austria 9 th <i>IEEE Int. Conference on Enterprise Distributed Object Computing</i> , Enschede, Netherlands
2004	26 th <i>Int. Conference Conference on Software Engineering</i> , Edinburgh, UK <i>Distributed Objects and Applications 2004</i> , Cyprus 19 th <i>IEEE Int. Conference on Automated Software Engineering</i> , Linz, Austria 8 th <i>IEEE Int. Conference on Enterprise Distributed Object Computing</i> , Monterey, California 7 th <i>Component Based Software Engineering Workshop</i> , Edinburgh, UK.
2003	25 th <i>IEEE Int. Conference Conference on Software Engineering</i> , Portland, Oregon 18 th <i>IEEE Int. Conference on Automated Software Engineering</i> , Montreal, Canada <i>Distributed Objects and Applications 2003</i> , Catania, Italy 7 th <i>IEEE Int. Conference on Enterprise Distributed Object Computing</i> , Brisbane, Australia
2002	11 th <i>International Software Configuration Management Workshop</i> , Portland, Oregon 24 nd <i>Int. Conference on Software Engineering</i> , Orlando, Florida 1 st <i>Int. IFIP/ACM Conference on Component Deployment</i> , Berlin, Germany 3 rd <i>Int. ACM Workshop on Software Performance (WOSP)</i> , Rome, Italy 6 th <i>IEEE Int. Conference on Enterprise Distributed Object Computing</i> , Lausanne, Switzerland 7 th <i>Int. Conference on Software Reuse</i> , Dallas, Texas
2001	16 th <i>Int. Conference on Automated Software Engineering</i> , San Diego, California, USA
2000	15 th <i>Int. Conference on Automated Software Engineering</i> , Grenoble, France
2000	5 th <i>Int. Workshop on Parallel and Distributed Software Engineering</i> , Limerick, Ireland
2000	22 nd <i>Int. Conference on Software Engineering</i> , Limerick, Ireland
1999	14 th <i>Int. Conference on Automated Software Engineering</i> , Orlando, Florida
1999	4 th <i>Int. Workshop on Parallel and Distributed Software Engineering</i> , Los Angeles, CA
1998	<i>Int. CAiSE Workshop on Component-based Information System Development</i> , Pisa, Italy
1998	5 th <i>Int. Conference on Object-Oriented Information Systems</i> , Paris, France
1998	13 th <i>Int. Conference on Automated Software Engineering</i> , Honolulu, Hawaii
1997	4 th <i>Int. Conference on Object-Oriented Information Systems</i> , Brisbane, Australia
1996	4 th <i>Int. Conference on the Software Process</i> , Brighton, UK

Reviews of Journal Submissions for

ACM Transactions on Software Engineering Methods
IEEE Transactions on Software Engineering
IEEE Transactions on Parallel and Distributed Systems
Software Practice and Experience
Automated Software Engineering
Int. Journal on Software Engineering and Knowledge Engineering
Theory and Application of Object Systems
Int. Journal on Software Process Improvement and Practice
IEE Proceedings Software

Reviews of Grant Proposals for

Member Engineering and Physical Research Council Peer Review College
Biotechnology and Biological Sciences Research Council
Natural Environment Research Council
Australian Research Council
Dutch Physical Science Council
Science Foundation Ireland

Research Activity

I began my research career by investigating the database support that is necessary to build integrated and process-centred software engineering environments. I obtained my PhD by showing that object database management systems can improve the flexible construction of integrated software engineering environments. The inherent disadvantages of many database systems, though, lie in their centralized nature which causes performance and scalability bottlenecks.

When moving to the UK and starting to collaborate with fellow academics and work with research fellows and research students, I became interested in architectures for decentralized process-centred software engineering environments that were also tolerant to inconsistency. I have investigated the principles of process-centred software engineering environments that tolerate non-compliance to prescribed processes. I have also researched methods and principles for managing software engineering artefacts using lightweight Web technologies. I have devised a method for handling UML diagrams in standard web browsers using the scalable vector graphics standard that emerged at the time. This work has influenced the OMG UML 2.0 standard for diagram interchange, that I co-authored. Moreover, I have devised the principles and theoretical foundation for managing inconsistencies of distributed semi-structured software engineering artefacts. This work has led to a patent and formed the basis of the UCL spin-off Systemwire Ltd.

Seeking to enable distribution of software engineering environments, I became interested in distributed object middleware. My research interest then broadened and generalized to different styles of middleware-based distributed software architectures to achieve real-time publication of data and the integration of disparate applications in enterprises.

Distributed software architectures are determined by a given set of available computational resources and the non-functional requirements, for example the performance, scalability and reliability, that they need to provide. For the last five years, the research agenda that I pursued within my research projects has been focussed on the investigation of principles, formalisms, methods, techniques and tools that, given a particular mix of non-functional requirements and computational resources, can assist in the systematic engineering of middleware-based software architectures that are fit for purpose. I have investigated the integration of the UML with a process algebra to facilitate reliability and prove absence of deadlocks and safety problems, as well as liveness analysis. Moreover, I am investigating the use of economic models, in particular real option theory, to assess the stability of a distributed software architecture.

A principle that has emerged in support of non-functional requirements, particularly in resource constrained environments, such as mobile systems is reflection. I have investigated and built prototypes for various forms of reflective middleware for mobile computing and am currently investigating the exploitation of reflection at the network and middleware level to address scalability, performance and reliability in the TAPAS, MANIAC and Promile projects. In the Promile project, I have investigated programming language principles for a programmable router platform that allows applications to influence how their network flows are being processed. I have demonstrated using an image processing application in the Maniac project that the principles of reflection work in practice. In TAPAS, we have devised a language to express service level agreements between autonomous parties that provide components and infrastructure for a distributed system in order to enable both the network and the middleware to monitor and reflect on the provision of non-functional requirements.

This year, I have started a number of e-science collaborations that explore distributed software architectures for protein folding, polymorph prediction and simulation of environmental processes at the molecular level. In these projects, we devise distributed software architectures that are built on Grid middleware, such as implementations of the Open Grid Services Architecture that meet particular scalability requirements.

My future research agenda will focus on establishing an engineering discipline for the construction of distributed software systems using middleware, in particular for distributed systems that span different administrative domains and involve wide area networks. This research will need to be collaborative, inter-disciplinary and applied in nature. I expect my research to reach out from requirements engineering and software architecture to testing of distributed components and component deployment. As a result, I hope to establish UCL as one of the internationally recognized centres of excellence for distributed software engineering.