

CURRICULUM VITAE

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NARRATIVE:

Wolfgang Pree's research focuses on software construction, in particular on methods and tools for automating the development of real-time embedded software and on component-based software systems. This includes all aspects of software construction, in particular (1) software design and implementation, (2) software reuse and composition as well as (3) programming methodology. Wolfgang Pree was a pioneer in the area of object-oriented design patterns. His book on the topic (Addison-Wesley, ACM Press, 1995) described the core construction principles of the patterns in the catalog by Erich Gamma et al. (Addison-Wesley, 1995). In the 1990s he was invited for numerous presentations on pattern construction principles, not only in the U.S. and Europe, but also in Japan, Australia, China, Brazil and Argentina. He was a pioneer in applying object-oriented construction principles to artificial neural networks in the second half of the 1990s. Numerous publications and the PhD thesis of Fabio Beckenkamp resulted from this research project.

Another focus has been on the domain of embedded real-time systems. Based on the Logical Execution Time (LET) abstraction invented by Prof. Tom Henzinger in the Giotto¹ project at the University of California, Berkeley, he came up with the Timing Definition Language (TDL) that comprises a real-time component model suitable for transparent distribution of TDL components and supports the integration of asynchronous activities in a time-triggered system. It could be demonstrated, for example, that TDL is feasible for explicitly describing the timing behavior of a car engine controller. This convinced Daimler to make TDL part of its next generation series of electrical cars which will be produced from 2019 on.

In a recent pioneering effort to virtualize complex embedded automation systems such as engine test beds, he came up with a modeling language that combines class-based and object-based modeling. A somehow comparable approach has been described by Prof. Colin Atkinson as clabject²-based modeling. In the past nine years Prof. Pree has embarked on a new research direction, Transportation Cyber Physical Systems, with the aim of delivering autonomously driving trains on open tracks, in a first step on the numerous small, self-contained secondary railway lines in Europe. This project called autoBAHN harnesses both of the research results sketched above, the TDL as basis for a deterministic, reliable safety-critical system, and deep neural networks as component for identifying the railway track in images and as one means for obstacle detection.

RESEARCH INTERESTS:

- software design and implementation, software reuse and composition, programming methodology and tools.
- deep neural network applications

¹ <http://embedded.eecs.berkeley.edu/giotto/>

² clabject = class + object

PROFESSIONAL PREPARATION:

- Ph.D. (German Dr.techn.) 1988-1992, Univ. Linz, [*sub auspiciis praesidentis*](#)
- MSc (German Dipl.-Ing.) 1984-1987, Univ. Linz, summa cum laude
- BS (German Cand.-Ing.) 1982-1984, Univ. Linz, summa cum laude

APPOINTMENTS:

- Full Professor of Computer Science, Univ. Salzburg, March 2002 — present
- Visiting Professor, UC San Diego, August 2006 – December 2006, September 2007 – January 2007
- Visiting Professor, UC Berkeley, August 2000 – February 2001, October 2001 – February 2002
- Full Professor of Computer Science, Univ. Constance, Germany, November 1996 — February 2002
- Associate Professor / Univ.-Doz., Univ. Linz, since 1995
- Guest Scientist, Siemens AG Munich, Germany, 1994 — 1996
- Visiting Assistant Professor, Washington University in St. Louis, 1992 — 1993
- Research Assistant, Univ. Linz, 1989 — 1995
- Research Assistant, University of Zuerich, Switzerland, 1987 — 1988

SELECTED PUBLICATIONS:

- [1] A. Naderlinger, S. Resmerita, W. Pree: Timing Definition Language (TDL)—from research prototype to series production, Dagstuhl seminar (to be published a Springer LNCS) Dagstuhl, Germany, February 25 - 28, 2018
- [2] S. Resmerita, A. Naderlinger, M. Huber, K. Butts, W. Pree: Applying Real-time Programming to Legacy Embedded Control Systems, International Symposium on Real-Time Computing (ISORC 2015) Auckland, New Zealand, April 13 - 17, 2015
- [3] J. Weichselbaum, C. Zinner, O. Gebauer, W. Pree: Accurate 3D-Vision-Based Obstacle Detection for an Autonomous Train, Computers in Industry Journal, Elsevier, 2013
- [4] S. Resmerita, W. Pree: Verification of embedded control systems by simulation and program execution control, American Control Conference (ACC 2012) Montréal, June 27 - 29, 2012
- [5] S. Resmerita, P. Derler, A. Naderlinger, W. Pree: Migration of legacy software towards correct-by-construction timing behavior, Monterey Workshop on Modelling, Development and Verification of Adaptive Computer Systems, Seattle, WA, March 31 - April 2, 2010
- [6] G. Dauenhauer, T. Aschauer, W. Pree: Variability in Automation System Models, International Conference on Software Reuse (ICSR'09), Falls Church, Virginia, USA, 27-30 September 2009
- [7] P. Derler, A. Naderlinger, W. Pree, S. Resmerita, J. Templ: Simulation of LET Models in Simulink and Ptolemy, Monterey Workshop 2008, Budapest, Sept. 24-26, 2008.
- [8] T. Aschauer, G. Dauenhauer, W. Pree: Towards Reusable Automation System Components, International Conference on Software Reuse (ICSR), Beijing, China, May 25 - 29, 2008.
- [9] E. Farcas, W. Pree: Hyperperiod Bus Scheduling and Optimizations for TDL Components, 12th IEEE Conference on Emerging Technologies and Factory Automation (ETFA), Patras, Greece. Sep. 25 - 28, 2007.
- [10] W. Pree, J. Templ: Modeling with the Timing Definition Language (TDL), Automotive Software Workshop San Diego (ASWSD 2006) on Model-Driven Development of Reliable Automotive Services (organized by M. Broy, I. Krüger), Springer LNCS.

- [11] E. Farcas, C. Farcas, W. Pree, J. Templ: Transparent Distribution of Real-Time Components Based on Logical Execution Time, ACM SIGPLAN/SIGBED 2005 Conference on Languages, Compilers, and Tools for Embedded Systems (LCTES'05).
- [12] T. Henzinger, C. Kirsch, M. Sanvido, W. Pree: From Control Models to Real-Time Code Using Giotto, IEEE Control Systems Magazine 23(1), February 2003.

SYNERGISTIC ACTIVITIES:

- Founder and CEO of Chrona.com since its incorporation in March 2004; profitable from the onset; selected customers: Toyota Motor Company – Toyota North America (Los Angeles – Gardena), AVL List (Graz, Austria), Magna Europe (Graz, Austria), L3-Com (UK), WindRiver (Munich, Germany), Continental (Regensburg, Germany), Daimler (Sindelfingen-Stuttgart, Germany)
- Director: C. Doppler Laboratory for Embedded Software Systems, University of Salzburg, Austria.
2007 — 2015. See <http://www.uni-salzburg.at/SRC>
- W. Pree: *Design Patterns for Object-Oriented Software Development*, book published by Addison Wesley/ACM Press, 1995. The book was translated to French (August 1998) and Japanese (June 1996)

KEY AWARDS:

- flagship project autoBAHN (autonomously driving trains on open tracks), sponsored by the Austrian Funds for Mitigating Climate Change, 2008 – 2013
- best paper award, 12th IEEE Conference on Emerging Technologies and Factory Automation, 2007.
- winner of the International BMW Scientific Award 2003.
- *Sub auspiciis praesidentis* to his doctorate thesis, awarded by the president of Austria (Dr. Thomas Klestil) in October 1992; this requires straight A grades for the last 4 years of high school and summa cum laude for BSc and MSc.

Ph.D. & POSTGRADUATE STUDENTS & COLLABORATORS:

M. Broy (TU Munich) K. Butts (Toyota North America) P. Derler (UC Berkeley) C. Farcas (UC San Diego) E. Farcas (UC San Diego) R. von Hanxleden (U Kiel) P. Hintenaus (i-red, Linz and U Salzburg) E. A. Lee (UC Berkeley) S. Seshia (UC Berkeley) A. Küpper (LMU Munich), J. Lefor (Microsoft Europe), C. Linnhoff-Popien (LMU Munich), I. Mandic (Magna Steyr), G. Menkhaus (SAF AG, CH), H.-P. Mössenböck (U Linz), K. Müller-Glaser (TU Karlsruhe) M. Odersky (EPFL Lausanne) A. Pasetti (ETH Zürich), M. Paulweber (AVL, Graz), C. Pfister (Oberon microsystems AG, CH), G. Pomberger (U Linz), E. Prem (eutema, Vienna), P. Puschner (TU Vienna), F. Radke (AVL, Graz), S. Resmerita (U Salzburg), B. Rumpe (RWTH Aachen, Germany), D. Schmidt (Vanderbilt) W. Schulte (Microsoft), Yongle Song (Sinowind, UK) G. Schuster (Siemens), A. Silva (U Porto Alegre), E. Steinberger (blue minds, Austria), C. Steindl (catalysts, Linz) Venkatesh SG (Infosys, Bangalore) plus colleagues at the Univ. Salzburg

