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Education

Ph.D. in Computer Science (2004), Department of Software Engineering,
Faculty of Mathematics and Physics, Charles University, Czech Republic.

Mgr. (MS equivalent) in Computer Science (1998), Department of Software Engineering,
Faculty of Mathematics and Physics, Charles University, Czech Republic.

Professional Experience

Visiting Researcher, International Institute for Software Technology, **United Nations University**, Macau (Sep. 2005 - Aug. 2006)

- Conducting research on projects of UNU-IIST, independently and in cooperation with Dr. Zhiming Liu, supervising fellows (visiting graduate students), teaching.

Researcher, Department of Software Engineering, **Charles University**, Czech Republic, 2004-present (on academic leave since Sep. 2005).

- Conducting research independently and on projects of the Distributed Systems Research Group.
- Teaching *Advanced Java* course and supervising graduate and undergraduate research.

Instructor, Research Assistant, Department of Software Engineering, **Charles University**, Czech Republic, 1998-2004.

- Conducting research independently and on projects of the Distributed Systems Research Group.
- Teaching *Advanced Java* course and review session seminars.

Teaching & Research Assistant, Department of Computer Science, **University of New Hampshire**, Durham, NH, U.S.A., 2002

- Conducting research (with Prof. Plasil, who was a visiting professor at the Department of Computer Science, University of New Hampshire).
- Teaching assistant (designing and grading assignments and exams, consultations with students, teaching several of the lectures).

Selected Publications and Technical Reports

All publications are available from `http://nenya.ms.mff.cuni.cz/publications.phtml`

Refereed Journal Publications

[Mencl04a] Mencl, V.: *Specifying Component Behavior with Port State Machines*, in *Electronic Notes in Theoretical Computer Science*, 101C:129–153, 2004. Special issue: F. de Boer and M. Bonsangue (eds): Proceedings of the Workshop on the Compositional Verification of UML Models (CVUML, part of UML 2003), Elsevier Science, Nov. 2004.

[PM03b] Plasil, F. and Mencl, V.: *Getting "Whole Picture" Behavior in a Use Case Model*, in Transactions of the SDPS: Journal of Integrated Design and Process Science 7(4), pp. 63-79, ISSN-1092-0617, Dec. 2003.

Refereed Conference Publications

[KAB+06] Kofron, J., Adamek, J., Bures, T., Jezek, P., Mencl, V., Parizek, P., Plasil, F.: *Checking Fractal Component Behavior Using Behavior Protocols*, accepted to the 5th Fractal Workshop (part of ECOOP'06), July 3rd, 2006, Nantes, France, Jul 2006

[MP06] Mencl, V., Polak, M.: *UML 2.0 Components and Fractal: An Analysis*, accepted to the 5th Fractal Workshop (part of ECOOP'06), July 3rd, 2006, Nantes, France, Jul 2006

[MB05] Mencl, V., Bures, T.: *Microcomponent-Based Component Controllers: A Foundation for Component Aspects*, in Proceedings of 12th Asia-Pacific Software Engineering Conference (APSEC 2005), Dec. 15-17, 2005, pp. 729-737, Taipei, Taiwan, ISBN 0-7695-2465-6, ISSN 1530-1362, IEEE Computer Society Press, Dec. 2005.

[MPA05] Mencl, V., Plasil, F., and Adamek, J.: *Behavior Assembly and Composition of Use Cases - UML 2.0 Perspective*, in Proceedings of Software Engineering (SE) 2005 conference, Innsbruck, Austria, Feb. 15-17, 2005, ISBN: 0-88986-466-7, ISSN: 1027-2666, pp. 193-201, ACTA Press, Feb. 2005.

[Mencl04b] Mencl, V.: *Deriving Behavior Specifications from Textual Use Cases*, in Proceedings of Workshop on Intelligent Technologies for Software Engineering (WITSE04, Sep 21, 2004, part of ASE 2004), Linz, Austria, ISBN 3-85403-180-7, pp. 331-341, Oesterreichische Computer Gesellschaft, Sep. 2004.

[PM03a] Plasil, F. and Mencl, V.: *Getting "Whole Picture" Behavior in a Use Case Model*, in Proceedings of IDPT 2003, Austin, TX, U.S.A., paper received the *Rudolf Christian Karl Diesel Best Paper Award*, ISSN 1090-9389, Dec. 2003.

[Mencl01a] Mencl, V.: *Autonomous Points in Component Composition*, Extended abstract of the Poster presented at OOPSLA 2001, in Conference Companion, pp. 83-84, ISBN 1-58113-441-X, ACM, Tampa, FL, U.S.A., Oct. 2001.

Work in Progress

[MD06] Drazan, J., Mencl, V.: *Improved Processing of Textual Use Cases: Deriving Behavior Specifications*, submitted, June 2006.

[LMRY06] Liu, Z., Mencl, V., Ravn, A. P., Yang, L.: *Harnessing Theories for Tool Support*, June 2006.

Other Publications

[Mencl04d] Mencl, V.: *From Textual Use Cases to Behaviour Specifications*, ERCIM News No. 59, Oct. 2004, published by ERCIM EEIG, Sophia-Antipolis Cedex, ISSN 0926-4981, pp. 64-65, `http://www.ercim.org/publication/Ercim_News/enw59/mencl.html`

[Mencl04c] Mencl, V.: *Use Cases: Behavior Assembly, Behavior Composition and Reasoning*, Ph.D. thesis, advisor: Frantisek Plasil, Department of Software Engineering, Charles University, Prague, June 2004.

[MH00] Mencl, V. and Hnetynka, P.: *Managing Type Information in an Evolving Environment*, Week of Doctoral Students WDS 2000, Charles University, June 2000.

[PPM99] Pospisil, R., Prochazka, M., and Mencl, V.: *On Performance of Enterprise Java Beans*, in Proceedings of Objekty'99, Prague, Nov. 1999.

[MPP99] Mencl, V., Z. Petrova, and F. Plasil: *Update description language (position paper)*, Week of Doctoral Students WDS 99, Charles University, June 1999.

[Mencl98] Mencl, V.: *Component Definition Language*, Master's thesis, advisor: Nguyen Duy Hoa, Charles University, May 1998.

Technical Reports

[MAB01] Mencl, V., Adamek, J., Buble, A., Hnetynka, P., and Visnovsky, S.: *Enhancing EJB Component Model*, Tech. Report No. 2001/7, Department of Software Engineering, Charles University, Prague, Dec. 2001.

[Mencl01b] Mencl, V.: *Managing Configuration of Update-enabled Software Components*, Tech. Report No. 2001/5, Department of Software Engineering, Charles University, Prague, Oct. 2001

[MH01] Mencl, V. and P. Hnetynka: *Managing Evolution of Component Specifications using a Federation of Repositories*, Tech. Report No. 2001/2, Department of Software Engineering, Charles University, Prague, June 2001.

Current Research Interests

Formal Methods in Model Transformations

I currently work with Dr. Zhiming Liu on applying the refinement calculus based component model *rCOS*, developed at UNU-IIST, to formally specify model transformations. The results will be applied in the software development platform MasterCraft, developed by our project partner Tata Consultancy Services (TCS). The ultimate goal is to assure that the software developed via transformations is correct, either by proving the transformations as correct, or by subsequently verifying the transformed model.

Runtime Behavior Analysis

In the *Component Reliability Extensions (CRE)* project between the Distributed Systems Research Group and France Telecom, I have focused on both static and runtime analysis of component behavior. In this project, *Behavior Protocols* (Plasil, F., Visnovsky, V., IEEE Trans. Software Eng. 28(11): 1056-1076, 2002) developed within our research group, have been applied to the *Fractal Component Model*. Here, the key issue has been to adopt behavior protocols to Fractal, i.e., to

account for its distinctive features such as multiple bindings and shared components. My contribution to this project is also in instrumenting Fractal components with controllers that support monitoring the components' behavior at runtime.

Component Models & Control Functionality

I have explored the role and desired features of the control part of a software component. Having identified the needs for an extensible framework for control functionality of software components, in cooperation with T. Bures, I have developed the *Asbaco Microcomponent Model* [MB05], which (i) allows to capture the internal structure of the control part, and (ii) allows to define consistent extensions of control functionality as *component aspects*.

Use Case Modeling, UML

I have analyzed, in collaboration with Prof. Plasil, the traditional *use case* modeling and identified its deficiencies, namely the lack of support for checking compatibility of behavior of related entities. We developed a simple formal model *Generic UC View*, identifying the core abstractions used in use case modeling and related the model to the existing use case technologies. Based on *Behavior Protocols*, we proposed *Pro-cases*, a behavior specification mechanism that permits assembling what we term the *whole picture* behavior of an entity. The behavior compliance relation of behavior protocols supports reasoning on compatibility and substitutability of Pro-case models. The paper describing these results received the *Rudolf Christian Karl Diesel Best Paper Award* at the IDPT 2003 conference and was later also published in the *Journal of Integrated Design and Process Science* [PM03b].

UML 2.0

Subsequently, in collaboration with Prof. Plasil and J. Adamek, I have related the Generic UC View to the behavior specification mechanisms available in the emerging UML 2.0 standard. I analyzed how these mechanisms support assembled behavior, representative use case and composed behavior, and whether consistency reasoning is possible. The results [MPA05] show that none of these mechanisms explicitly addresses assembled behavior, representative use case, nor composed behavior. However, I show a way to interpret these concepts in Interactions.

I have also, together with Matej Polak, explored the structural modeling part of UML 2.0, which newly features constructs for modeling software components. The goal of this work is to analyze the component modeling framework provided by UML 2.0 with respect to how its abstractions match the concepts used in currently available advanced component models; the results of the analysis are supported by a mapping to two selected advanced component models, SOFA and Fractal.

Port State Machines

Based on the experience with UML 2.0, I proposed *Port State Machines* for specifying behavior of UML 2.0 components. The key achievement is the support for call interleaving and nesting, provided in a way that permits reasoning and verification of composition via the behavior protocols compliance relation. The compliance relation is decidable and a verifier tool is available. Besides the version presented at the *Compositional Verification of UML Models* workshop (part of UML2003), an extended version of the paper has been published in the *Electronic Notes on Theoretical Computer Science (ENTCS)* [Mencl04a]. I have subsequently supervised the work of J. Samek, where the goal was to specify the behavior compliance relation of Port State Machines in the Object Constraint Language (OCL), in order to make Port State Machines more accessible for use in UML tools.

Analyzing Textual Use Cases

I have employed a statistical natural language parser to understanding textual use cases [Mencl04b]. Utilizing the simple and uniform sentence structure of textual use cases, I have proposed a conversion scheme to derive a behavior specification from a textual use case model, based on parse trees obtained using readily available natural language processing tools. The derived behavior specification may be used to obtain the whole picture of the behavior and to aid with the initial design of the system described by the use cases.

Besides the initial prototype tool, the proposed conversion scheme has been implemented within a student software project under my supervision in an interactive environment for requirement specification, the *Procasor Environment*. The conversion scheme has been under my supervision further improved by J. Drazan. The improvements in particular allow to process more complex sentences, not adhering to the simplifying guidelines, yet commonly used in the use case writing industrial practice.

Projects

United Nations University

At the United Nations University (UNU-IIST), I currently participate together with Dr. Zhiming Liu in a joint project with Tata Consultancy Services (TCS), where the goal is to utilize the refinement calculus based component model *rCOS*, developed at UNU-IIST, to formally specify and subsequently verify transformations of design models employed in the TCS development platform MasterCraft.

Charles University

I have actively participated in the following projects of the Distributed Systems Research Group:

Component Reliability Extensions (CRE) to the Fractal Component Model

In this joint project with France Telecom, my contribution has been in instrumenting components with runtime behavior analysis and integrating the behavior analysis tools developed within our research group into the Fractal component model.

OSMOSE/ObjectWeb, `http://www.objectweb.org/` — Involved in Work-package 2 (Architecture & Middleware Components), contributed to the Behavior Framework (Port State Machines).

SOFA Project (Software Appliances), `http://nenya.ms.mff.cuni.cz/SOFA/`

Participating since Master's thesis (1998, Component Definition Language); supervised several Master's theses which were a part of this project (Z. Petrova: Update Description Language, 1999; P. Hnetynka: Type Information Repository, 2000, M. Polak: UML 2.0 Components, 2005, J. Samek: Employing OCL for specifying behavior compliance, 2005). Designed the Component Definition Language (CDL) and implemented initial version of the CDL compiler; contributed to initial design and implementation of the runtime environment.

EJB Comparison Project, `http://nenya.ms.mff.cuni.cz/EJBCOMP/`

Contributed to the gathering and analyzing of performance and standards-compliance data, designed and implemented a high precision timer for Java; participated in writing the project report. This project continued as a part of the PEPiTA ITEA project, which received the ITEA Achievement Award 2002 at the ITEA Symposium 2002 in Amsterdam, Oct. 10-11, 2002.

CORBA Comparison Project, `http://nenya.ms.mff.cuni.cz/COMP/`

Contributed to analyzing and visualizing of performance data; designed and implemented a tool for creating graphs from the gathered data.

Teaching Experience

Courses Taught

Selected Topics in the Java Programming Language (also: *Advanced Java*), PRG021, Charles University, 2001 (spring), 2003 (spring, fall), 2004 (fall)

The course covers advanced aspects of the Java programming language and demonstrates practical applications of the Java platform.
`http://nenya.ms.mff.cuni.cz/~mencl/vsjava/syllabus-en.html`

Object Oriented Methodology, CS 719/819, University of New Hampshire 2002 (spring,fall)
Teaching Assistant: designing and grading assignments and exams, creating handouts, consultations with students, teaching several of the lectures.

Topics in Computer Science/Distributed Component-Based Programming, CS 780/880, University of New Hampshire 2002 (spring,fall)
Teaching Assistant: designing and grading assignments and exams, creating handouts, consultations with students, teaching several of the lectures.

Operating Systems, SWI004 (seminar), Charles University, 1999-2000

The seminar is an integral part of the Operating Systems course (discussions of selected course topics, review sessions).

Object Oriented Systems, SWI068 (seminar), Charles University, 2004 (spring), 2005 (spring)

The seminar is an integral part of the Object Oriented Systems course; topics include developing practical CORBA programming skills and creating a UML model of the system being designed.

Programming in C and C++, PRG029 (seminar), Charles University, 2004 (spring)

The seminar is an integral part of the Programming in C and C++ course; the seminar focuses on developing practical C/C++ programming skills (freshman/sophomore students).

Individual Software Project, PRG019, Charles University, 2004 (spring)

In the course, sophomore year students develop a larger individual software project, first proposing a vision of project goals, followed by a detailed project specification, which they finally implement.

Theses & Projects Supervised

Drazan, J.: *Natural Language Processing of Textual Use Cases*, Master's thesis, advisor: Vladimir Mencl, Charles University, Feb. 2006.

Polak, M.: *UML 2.0 Components*, Master's thesis, advisor: Vladimir Mencl, Charles University, Sep. 2005.

Samek, J.: *Employing OCL for specifying behavior compliance*, Master's thesis, advisor: Vladimir Mencl, Charles University, Sep. 2005.

Hnetynka, P.: *Managing Type Information in an Evolving Environment*, Master's thesis, advisor: Vladimir Mencl, Charles University, Sep. 2000

Petrova, Z.: *Update Description Language*, Master's thesis, advisor: Vladimir Mencl, Charles University, Sep. 1999

Francu, J., Ondrusek, J., Fiedler, M., Plsek, A.: *Procasor Environment: Interactive Environment for Requirement Specification*, Software project, supervisor: Vladimir Mencl, Charles University, Sep. 2005.

Benes, J.: *Netshare – networked group organizer*, undergraduate thesis, supervisor: Vladimir Mencl, Charles University, May 2000

Invited Talks (Universities, Research Seminars)

Plasil, F., Mencl, V.: *Getting "Whole Picture" Behavior in a Use Case Model*, CS900 Colloquium Seminar, Department of Computer Science, University of New Hampshire, Durham, NH, U.S.A., Dec. 2003

Mencl, V.: *From Textual Use Cases to Behavior Specifications*, Colloquium, Computation and Information Structures, Technical University Berlin and Fraunhofer Institute for Software and Systems Engineering (ISST), Berlin, Germany, Apr. 2004

Mencl, V.: *Specifying Component Behavior with Port State Machines*, Colloquium, Computation and Information Structures, Technical University Berlin and Fraunhofer Institute for Software and Systems Engineering (ISST), Berlin, Germany, Apr. 2004

Mencl, V.: *SOFA/Fractal Component Design via Use Cases*, ObjectWeb Architecture Meeting, Charles University, Prague, Czech Republic, Jul. 2004

Mencl, V.: *Deriving Component Behavior Specifications from Textual Use Cases*, Department of Computer Science, Concordia University, Montreal, QC, Canada, Jul. 2004

Awards, Grants, Funds, Scholarships, Volunteer Activities

Award: The paper [PM03a] I coauthored with Prof. Plasil received the *Rudolf Christian Karl Diesel Best Paper Award* at the IDPT'2003 conference held on Dec 3-5, 2003 in Austin, TX, U.S.A.

Funding: I have actively participated in writing funded grant proposals for projects of the Distributed Systems Research Group: Grant Agency of the Czech Republic (GACR) project 201/03/0911 (funded) and European Union FP6 IST project EUCOSM. Together with Dr. Tuma and Prof. Plasil (primary investigator), I have submitted a GACR project proposal on *practically applicable formal methods for developing component-based systems* to start in 2006, which as been accepted for funding as project 201/06/0770.

My research has been funded from the GACR projects number 201/03/0911, 201/99/0244 and 102/03/0672 and from the ITEA (Information Technology for European Advancement) projects PEPiTA and OSMOSE.

Professional service:

Currently, I together with Frank de Boer (CWI, The Netherlands) jointly organize as program committee chairs the *Third International Workshop on Formal Aspects of Component Models (FACS'06)* to be held in September 2006.

I serve and have served on the program committees of

- 11th IEEE International Conference on Engineering of Complex Computer Systems (ICECCS 2006)
- SOFSEM 2007 (Track: Dependable Software and Systems),
- International Conference on Computer, Communication and Information Technologies (ICCCIT), July 14-16, 2007, Tabriz, Iran

- III Workshop of Software Engineering and Data Bases (WISBD), part of CACIC2006, XII Argentine Congress of Computer Science, October 17-21, 2006, San Luis, Argentina

I have served as referee for the journal *Computing and Informatics (CAI)*, published by the Slovak Academy of Sciences, and for the International Journal of Computer and Information Science (special issue dedicated to selected papers from the SNPD'03 conference).

I have served as an additional referee for the conferences: SNPD'03, IASSE'04, EDOC'04, SOFSEM 2004, SOFSEM 2005, AICCSA-06, FESCA 2006, the C@MoDE 2005 workshop, and for the UTP 2006 symposium.

I serve as a reviewer for Computing Reviews (ACM & Reviews.com).

I have served as the session chair of the session *Software Methodologies and Protocols*, a part of the SE 2005 conference held in Innsbruck, Feb. 15-17, 2005, and as the session chair of the session Aspect-Oriented Software Technology at the APSEC 2005 conference held in Taipei, Taiwan, Dec. 15-17, 2005.

Scholarships:

Received travel scholarship from the *Josef, Marie, and Zdenka Hlavkovi Foundation* to attend the OOPSLA 2001 conference.

Received travel scholarship from the *Bernard Bolzano Foundational Fund* to attend the OOPSLA 2001 conference.

Volunteer activities:

Participated as a student volunteer at the OOPSLA 2001 conference.

References

Prof. Frantisek Plasil

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