

RESUME

Michael Sobolewski, Ph.D.

Lab: <http://sorcersoft.org>

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PERSONAL DATA

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PROFESSIONAL INTERESTS

Primary:

- Metacomputing
 - Service-oriented systems
 - Multifidelity net-centric system
 - Service-oriented and meta-programming
 - Agent-based systems
 - Network security
 - Integrating frameworks
 - Information sharing
 - Collaborative work
 - Knowledge-based integration
- Mobile Computing
- Object-oriented/Java programming
- SW Architectures
- Software engineering

Secondary:

- Bioinformatics
- Hypermedia and multimedia
- Computer graphics
 - Visualization of information
 - Visual languages
 - Man-machine graphical interfaces
 - Visual programming & program visualization
 - Graphical algorithms
- Artificial intelligence
 - Knowledge description and representation
 - Knowledge discovery and data mining
 - Reasoning
 - Control strategies
 - Knowledge-based systems
- Concurrent Engineering
- Programming languages and systems
- Computer image processing
- Pattern recognition
- Computer-aided education

GUIDING PRINCIPLES AND PERSONAL VALUES

Success is derived from integrity, quality, and dedication.
Success is measured by the success you generate via others.
Be bold, consider the unconventional, strive for excellence, and aim high.

EDUCATION AND DEGREES

- 2012** **Doctor of Science (Sc.D.), Polish-Japanese Academy of Information Technology**
- 1999: Software Project Planning and Management, Learning Tree Intl, November 1999.
- 1999: Oracle8 Applications Development and Tuning: Hands On, Learning Tree Int., November 1999.
- 1999: Verity Fundamentals, Verity Education Services, October 1999.
- 1999: Jet Engines and Propulsion Systems for Engineers, GE Course, June 1999.
- 1999: Jini Technology: Distributed Services Programming, SUN Microsystems Course, May 1999.
- 1999: Change Acceleration Process (CAP), GE CRD Course.
- 1999: Design for Six Sigma, GE CRD Course.
- 1999: Intensive Course in Application of the Key Listening Skills, GE CRD, March 1999.
- 1998: Implementing Java Security, SUN Microsystems Course, June 1998.
- 1998: Developing CORBA Applications with Java, SUN Microsystems Course, USA, April 1998.
- 1997: Advanced Java Workshop - Sun Microsystems Course, December 97
- 1997: Project Leadership Course, GE, April, 1997
- 1997: Persuasive Presentations Course, GE, June 1997
- 1996: Basic Java and Advanced Java Programming, SUN Microsystems Course, May 1996
- 1994: Encina Application Programming, Transarc Education Course - Pittsburgh, PA, USA.
- 1994: DCE Secure Core Application Programming, Transarc Education Course - Orlando, FL, USA.
- 1993: Master of Business Administration at West Virginia University, completed two semesters.**
- 1980: Summer School on Combinatorics and Complexity of Algorithms, Barcelona, Spain.
- 1978: Ph.D., Computer Science, Institute of Computer Science of Polish Academy of Sciences, Warsaw, Poland. The Ph.D. Thesis: *A class of languages and models for pattern recognition.***
- 1977: Summer School on Mathematical Foundations of Computer Science, University of Turku, Finland.
- 1973-1974: Mathematical Foundations of Computer Science Semester, Banach Center, Warsaw.
- 1971-1972: Courses on Applications of Mathematics (Computer Theory, Mathematical Linguistics for Programming Languages, Algorithmic Logic, Methods of Compilation, Numerical Simulation), Institute of Mathematics of Polish Academy of Sciences, Warsaw.

1965-1971: M.Sc., Computer engineering, Gdansk University of Technology (1965-1967), Gdansk, Poland and St. Petersburg Electrotechnical University "LETI" (1967-1971), St. Petersburg, Russia. The M.Sc. Thesis: *Recognizing signals of electro-paramagnetic resonance.*

SCHOLARSHIPS AND AWARDS

- 2018 Presented with the [Albert Nelson Marquis Lifetime Achievement Award](#) by Marquis Who's Who
- 2014 [Life Time Achievement Award](#) by ISPE-USA
- 2009: Who's Who in the World – from 27th Edition
- 2008: Who's Who in America – from 63rd Edition
- 2008: Best Paper Award for ASIA'08, Secure Space Computing with Exertions, 3rd Annual Symposium on Information Assurance (ASIA'08)
- 2007: ASEE Faculty Fellow for 2007 Air Force Summer Faculty Fellowship (SFFP) at AF Research Laboratory, Wright Paterson AFB, June-August
- 2007: Awarded the title of Honorary Professor of Computer Science at Ulyanovsk State University, Russia, May 22, 2007
- 2007: Visiting Scholar, thought SORCER, Ulyanovsk State University, Ulyanovsk, Russia, May 21-24
- 2007: Visiting Scholar, thought SORCER, Samara State Aerospace University, Samara, Russia, May 16-20
- 2007: Who's Who in Collegiate Faculty
- 2006: Visiting Scholar, thought SORCER, Beijing Jiaotong University, Beijing China, Sept 3-9
- 2006: Visiting Scholar, thought SORCER, BeiHang University, Beijing China, Dec 12-20
- 2006: ASEE Faculty Fellow for 2006 Air Force Summer Faculty Fellowship (SFFP) at AF Research Laboratory, Wright Paterson AFB, June/July/August
- 2005: Award for Outstanding Service as the General Chairman for the 12th International Conference on Concurrent Engineering, Ft. Worth, Texas
- 2006: Visiting Scholar, thought FIPER/SORCER, Samsung Advanced Institute of Technology (SAIT) , Seoul, S. Korea, August 5-7, 2004
- 2004: Award for Outstanding Service as the Program Chairman for the 11th International Conference on Concurrent Engineering, Beijing, China
- 2003: Visiting Scholar, thought FIPER/SORCER, Beijing Jiaotong University, Beijing China, Sept 25-30
- 2002: Best Paper Award on the basis of Presentation to the 8th ISPE/CE'2001 Int. Conference on CE and Publication in the Int'l Journal of Concurrent Engineering: Research &

- Applications (CERA); Volume 10, No.4, Dec 2002.
- 2000: The Knight of the St. Stanislas Order, November 2000.
- 2000: Continental Who's Who Premier Member.
- 2000: GE Managerial Award (FIPER)
- 1999: Effective Listening Award for Achievement, March 1999.
- 1999: GE Managerial Award
- 1998: GE Six Sigma Green Belt certified
- 1998: GE Managerial Award (UNS Notebook, EMPIS)
- 1998: Included in the 1998/99 Strathmore's Who's Who V.I.P. of Business Leaders; honored by Strathmore's Who's Who as a Lifetime Member.
- 1997: Included in the 1997/98 Strathmore's Who's Registry of Business Leaders.
- 1996: GE Managerial Award (CAMnet)
- 1996: Leadership Award and admitted to the Grade of Senior Member in the International Society for Productivity Enhancement (ISPE).
- 1996: Award for Outstanding Service as the Program Chairman for the Third International Conference on Concurrent Engineering - Research and Applications held in Toronto, Canada, August 1996.
- 1995: Award for Outstanding Service as the Program Chairman for the Second International Conference on Concurrent Engineering - Research and Applications held in McLean, VA, August 1995.
- 1994: Award for Outstanding Service as the Program Chairman for the First International Conference on Concurrent Engineering - Research and Applications held in Pittsburgh, PA, August 1994.
- 1994: Award for Outstanding Service to Mechanical and Aerospace Engineering Department, WVU.
- 1993: Fellow Member of International Society for Productivity Enhancement (ISPE).
- 1987, 1989: Visiting Scholar, Ecole Polytechnique Federal de Lausanne, Lausanne, Switzerland.
- 1985, 1987: Visiting Scholar, Czechoslovak Academy of Science, Prague, Czechoslovakia and Slovak Academy of Sciences, Bratislava, Slovakia.
- 1983: Visiting Scholar, Bari University and Milan University, Italy.
- 1982, 1984: Visiting Scholar, Russian Academy of Sciences, Moscow, USSR.
- 1980, 1985: Visiting Scholar, University of Illinois at Urbana-Champaign, USA.
- 1978: Visiting Scholar, Turku University, Finland.
- 1978: Visiting Scholar, Stockholm University, Sweden.
- 1975, 1989: Visiting Scholar, Technical University of Ilmenau, Ilmenau, Germany.
- 1971: M.S. Diploma with Distinction, Magna Cum Laude, Gdansk Technical University, Gdansk, Poland and St. Petersburg Electrotechnical University "LETI", St. Petersburg, Russia.
- 1967: Polish Government Scholarship at the St. Petersburg Electrotechnical University "LETI", St. Petersburg, Russia.
- 1965-1967: Numerous Semester Prizes of the Rector of the Gdansk Technical University, Gdansk, Poland.

1965: The Valedictorian Award, High School in Morag, Poland

EXPERTISE SUMMARY

1. Strong (European) foundations in theoretical computer science, artificial intelligence, logic, and mathematics.
2. Strong (American) background in heterogeneous, distributed software systems and development.
3. Well balanced mix of advanced research & development and teaching experience.

PROFESSIONAL EXPERIENCE

Employment record:

2010-present	Professor, Polish-Japanese Institute of IT, Warsaw, Poland
2008-present	World Class Scientist, Air Force Research Laboratory, Wright Paterson AFB
2002-present	Director, SORCER Laboratory, http://sorcersoft.org SORCER research: http://sorcersoft.org/research/ SORCER theses: http://sorcersoft.org/theses/ SORCER Laboratory timeline at: http://sorcersoft.org/about/timeline.html
2002-2009	Professor of Computer Science, Texas Tech University, Lubbock, TX 79409
1994-2002	Senior Computer Scientist, General Electric Global Research Center (GE GRC), Schenectady, NY 12031
1989-1994	Research Associate, Concurrent Engineering Research Center, West Virginia University, WV
1991:	Visiting Professor, Statistics and Computer Science Department, West Virginia University, WV (a joint appointment between Statistics and Computer Science Department (50%) and the Concurrent Engineering Research Center, WVU (50%))
1988-1989:	President, Technowiedza Knowledge-Based Systems, Inc., Warsaw, Poland
1988-1989:	Research Professor, Institute for Industrial Organization and Management, Warsaw, Poland
1987:	Visiting Professor, Institute of Technical Cybernetics, Slovak Academy of Sciences, Bratislava, Slovakia
1986-1987:	Adjunct Professor, Department of Computer Science, Silesian University, Sosnowiec, Poland
1982-1984:	Adjunct Professor, Warsaw Technical University, Warsaw, Poland
1980:	Visiting Professor, Computer Science Department, University of Illinois, Urbana Champaign, IL
1971-1990:	Research Professor, Polish Academy of Sciences, Warsaw, Poland

Positions held at the Polish Academy of Sciences:

- 1983-1988: Head, Expert Systems Laboratory, IBIB PAN
1981-1982: Head, Picture Recognition and Processing Department, IBIB PAN
1976-1982: Head, Pattern Recognition Methodology Laboratory, IBIB PAN

Research areas:

- 1991-present Research in metacomputing, mobile computing, service-oriented systems, security, collaborative graphical user interfaces, information sharing systems, databases, enterprise integrating frameworks, AI.
1989-1991: Research in knowledge-based systems for concurrent engineering, development of the DICEtalk engineering knowledge-based environment; graphical user interfaces, development of the GUI for DICEtalk system.
1986-1989: Research in object-oriented computer graphics and interactive graphical interfaces, development of the Expertalk interactive graphical user interfaces.
1985-present Research in object-oriented programming
1980-1989: Research in AI: knowledge description and knowledge representation (new logic formalism called percept calculus); reasoning and control strategies for knowledge-base systems (Expertalk and DICEtalk).
1988-1989: Development of the Expertalk object-oriented knowledge-based system, Technowiedza Knowledge-Based Systems Inc..
1987-1988: Design and implementation of the Smalltalk-80 environment for MERA-STER, Katowice (Poland); head of the project.
1975-1981: Research in pattern recognition: methodology and basic algorithms, languages and models for pattern recognition.
1971-1974: Research in computer image processing and recognition: image analysis methodology and basic algorithms for automatic character readers.

TEACHING EXPERIENCE

- 2010-present Instructor, Computer Science, Polish-Japanese Institute of IT, Software Engineering, January 2010
2002-2009 Professor, CS Department Texas Tech University: computer networks (Spring 2003, Fall 2004, Fall 2005, Fall 2007), communication networks (Spring 2005, Fall 2006, Fall 2007, Fall 2008), network security (Fall 2002), advanced network programming, (Spring 2003), OO programming in Java (Summer II 2003, Fall 2004, Spring 2006), design patterns (Fall 2005), peer-to-peer computing (Fall 2003), mobile computing (Fall 2004), senior design project (Fall 2006, Spring 2007), computer science seminar (Fall 2003), software

- engineering (Spring 2008, Fall 2008, Spring 2009, Fall 2009).
- 1991: Visiting Professor, graduate course on interactive computer graphics, Statistics and Computer Science Department, West Virginia University, USA.
- 1989/1993: Visiting Professor, course on Concurrent Engineering and Computer Integrated Manufacturing, Mechanical and Aerospace Department, West Virginia University, USA.
- 1989: Visiting Professor, lectures on the Expertalk knowledge-base system. Technical University of Ilmenau, Ilmenau, Germany.
- 1989: Visiting Professor, lectures on the Expertalk knowledge-base system. AI Laboratory, Ecole Polytechnique Federal de Lausanne, Lausanne, Switzerland.
- 1988/1989: Course on artificial intelligence and expert systems. Courses on Application of Mathematics, Institute of Mathematics of the Polish Academy of Sciences, Warsaw, Poland.
- 1987: Visiting Professor, lectures on percept description and percept representation, object oriented programming (Smalltalk-80). Basic International AI Laboratory, Institute of Technical Cybernetics, Slovak Academy of Sciences, Bratislava, Slovakia.
- 1987: Visiting Professor, lectures on percept calculus and percept networks. Ecole Polytechnique Federal de Lausanne, Lausanne, Switzerland.
- 1986/1987: Associate Professor, course on knowledge engineering. Silesian University, Sosnowiec, Poland.
- 1985: Visiting Professor, lectures on knowledge representation. University of Illinois at Urbana-Champaign, USA.
- 1982-1984: Assistant Professor, course on principles of AI. Warsaw Technical University, Warsaw, Poland.
- 1980: Visiting Professor, lectures on languages and models for pattern recognition (based on my Ph.D. Thesis). University of Illinois at Urbana-Champaign, USA.
- 1975: Visiting Professor, course on fuzzy sets. Technical University of Ilmenau, Ilmenau, Germany.

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS

Association of Computing Machinery (ACM)
 Institute of Electrical and Electronics Engineers (IEEE)
 International Society for Productivity Enhancement (ISPE)

PROGRAMMING EXPERIENCE

SPARC, Apple Mac OS X, DEC, HP, SGI, Win/Intel:

Java/Jini/Rio/Web: GApp/FIPER/SORCER (Generic Client/Server and P2P Applications) 500K lines of Java code,
 Based on GApp framework - more than 250K lines of Java code.

C++, C, Motif, Xt, X11, MotifApp, NIH classes:

A graphical user interface for the information

	sharing system (ISS), 20,759 lines of C++ code and the extended <i>MotifApp</i> library, 7,804 lines of C++ code; a graphical user interface for a collaborative medical informatics system (ARTEMIS), 22,201 lines of C++ code and the extended <i>MotifApp</i> library, 8,505 lines of C++ code;
<i>Objectworks/Smalltalk:</i>	DICETalk knowledge-based system, its graphical user interface and graphical data presentation module, 25,100 lines of <i>Objectworks for Smalltalk</i> program (only <i>Smalltalk</i> methods, not counting class definitions and knowledge bases).
Macintosh :	
<i>Objectworks/Smalltalk:</i>	DICETalk knowledge-based system, its graphical user interface, 25,100 lines of <i>Objectworks for Smalltalk</i> program (only <i>Smalltalk</i> methods, not counting class definitions and knowledge bases);
<i>Smalltalk/V Mac:</i>	DICETalk knowledge-based system, its graphical user interface; several graphical algorithms, 21,800 lines of <i>Smalltalk/V Mac</i> program (only <i>Smalltalk</i> methods, not counting class definitions and knowledge bases).
IBM PC-XT/AT:	
<i>Smalltalk/V:</i>	Expertalk and DICETalk knowledge-based systems, their graphical user interfaces; several graphical algorithms, 22,300 lines of <i>Smalltalk/V</i> program (only <i>Smalltalk</i> methods, not counting class definitions and knowledge bases);
<i>PROLOG:</i>	experimental medical expert systems;
<i>TURBO C++, C:</i>	bitmap font editor;
<i>TURBO PASCAL:</i>	3-D spline algorithms;
<i>BASIC:</i>	down loaded fonts for matrix printer.
MERA 400:	
<i>LOGLAN, Smalltalk-80:</i>	<i>Smalltalk-80</i> implementation project .
K-202:	
<i>ASSK assembler:</i>	library of graphical routines and language for pattern recognition.
ODRA 1204:	
<i>ALGOL 1204:</i>	various image processing programs; automatic character recognition programs; neural network programs for features detection.
MINSK:	
<i>assembler:</i>	programs for recognizing of signals of electro-paramagnetic resonance.

PROJECT HISTORY

1. Project: SORCER (Service-ORiented Computing EnviRonment)

<http://sorcer.cs.ttu.edu>, Texas Tech University, and AFRL/WPAFB, 2002-present, \$500,000 funding from GE Global Research Center, Air Force Research Lab, Community Foundation of Abilene

Director of the SORCER lab, responsible for academic research in all aspects of service-oriented computing and SOA.

SORCER research: <http://sorcersoft.org/research/>

Results: 24 students graduated - <http://sorcersoft.org/theses/>

Results: working SORCER environment at AFRL/WPAFB.

2. SCoD Project between Beijing Jiaotong University (BJTU) and Texas Tech University (TTU), August 2007-August 2010

SCoD - the collaborative project of development and application of a SOA-based Collaborative Design platform. The SCoD project established as the collaborative effort between SORCER Lab, Texas Tech University, TX, and Intelligent Engineering Lab, Beijing Jiaotong University, Beijing, China; Professor Michael Sobolewski, in charge of SORCER Lab, TTU and Professor Jianzhong Cha in charge of IE Lab, BJTU. Based on SORCER, a service-oriented collaborative design platform deployed to integrate CAD and CAE software tools as services for design and analysis of railway bogie.

3. CoSEA Project between Beihang University (BUAA) and Texas Tech University (TTU), July 2007-July 2009

CoSEA - the Collaborative project of studying SOA and applying for Engineering Application. The CoSEA project established as the collaborative effort between SORCER Lab, Texas Tech University, TX and 720 Lab, BeiHang University, and Beijing, China; Professor Michael Sobolewski, in charge of SORCER Lab, TTU and Professor Jia Ti Deng in charge of 720 Lab, BUAA. Deployed a Federated Service-Oriented Integration Framework (SOIF) for Complex Engineering System Design in aerospace domain.

4. Project: FIPER (Federated Intelligent Product EnviRonment) (NIST/GEAE+-\$14,000,000) (1999-2003)

As an architect and FIPER lead developer responsible for the design and implementation of the FIPER service-to-service (S2S) infrastructure. Developed a service-based programming methodology for the project.

Results: working prototypes demonstrated to NIST annually.

5. GE CRD GApp-based Projects (1997-2001, \$5,580,000)

As a project leader, responsible for the design and implementation of the Java Generic Application (GApp) framework used for the following projects:

- a. Tube Cooling Algorithm EDN (GEMS, \$50,000)
- b. Unified Numbering System (F118/F100 engine) (GEAE, \$550,000)
- c. Agile Castings Notebook (DARPA, \$4,000,000, DARPA)
- d. Toolpaths from Engineering Data (6 Sigma) project (GEPS, \$50,000)
- e. GEEE (GE Electronic EMPIS, Order Data Book, \$430,000)
- f. GE Plastics Engineering Calculator (GEP, \$500,000)

Results: working prototypes or production version of the applications across GE

businesses.

6. Project: CAMnet (ARPA, \$1,500,000)

As a project leader, responsible (Dec 94-Dec 96, with five other researchers) for the design and implementation of the WWW Services Toolkit and four exemplary applications: Plastics Application Design Guide, Plastics Material Selection Tool, Supplier Prequalification Tool and Environmental Manufacturing Advisor. Personally responsible for much of the requirements, design and project coordination. Responsible also for the project node (<http://camnet.ge.com/camnet/>), all shared project documents and publications.

Results: working version of the WWW Services Toolkit and four applications.

Hardware: Server: UNIX, Client: UNIX, IBM PC, Macintosh.

Software: CGI/Tcl, HTML, C++, SQL.

7. Project: Electronic Design Notebooks (GE AE), Task: Logistics EDN

As an architect and lead developer responsible (Oct 94-Dec 94, with three other researchers for the design and implementation of the Logistics EDN for GE AE. Personally responsible for much of the design and implementation of the Logistics EDN Launcher, an instance of design record book (DRB), dynamic HTML links in CID documents.

Results: working version of the Web executable mockup.

Hardware: SPARC10.

Software: CGI/Tcl, HTML.

8. Project: Global Finance Enterprise Architecture

As an architect (Citicorp North America, Inc., March 1994-May 1994) of the Global Finance distributed systems, responsible for the definition of physical, software and information sharing architectures in the context of object-orientation and reuse.

Results: A report and two-day presentations for Citicorp architects in Dallas and New York.

9. Project: ARTEMIS (ARPA), Task: ARTEMIS GUI

As an architect and lead developer of the role-based GUI for a collaborative medical informatics system, responsible (April 93 - Jan 94, with four other researchers and two graduate students) for the design and implementation of the ARTEMIS GUI mockup. Personally responsible for much of the design and implementation of the Extended MotifApp library, and the implementation of large parts of views, models, and controllers including the system integration. Responsible also for the group training including object-oriented graphics, X11, Xt, Motif, and C++.

Results: working version of the ARTEMIS GUI executable mockup. The ARTEMIS GUI executable mockup: 27,758 lines of C++ code; MotifApp: 8,650 lines of C++ code.

Hardware: SUN4, SPARC2.

Software: C++, X11, Xt, Motif, MotifApp, NIH classes, ObjectCenter, VERSANT.

10. Project: DICE (DARPA), Task: ISS GUI

As a designer and lead developer (May 1992 - Feb 1993) of the GUI for the DICE Information Sharing System (ISS), responsible for the design, implementation, and integration of the GUI with the ISS.

Results: working version of the ISS GUI.

The ISS GUI: 20,759 lines of C++ code; MotifApp: 7,804 lines of C++ code.

Hardware: SUN4, SPARC2.

Software: C++, X11, Xt, Motif, MotifApp, NIH classes, ObjectCenter, VERSANT.

11. Project: DICE (DARPA), Task: DICE GUI

As a designer (August 1991-May 1992) of the GUI, responsible for the design of the graphical user interface for the DICE Concurrent Engineering Environment. Teaching graduate course on interactive computer graphics (CS380), Statistics and Computer Science Department, West Virginia University.

Results: A design of the GUI for the DICE Concurrent Engineering Environment.

12. Project: DICE (DARPA), Tasks: Fast Track Modeling, Design Process Models

As a designer and lead developer (November 1989-July 1991) of the DICEtalk knowledge-based environment for concurrent engineering, responsible for the design, implementation, and integration of more than twenty knowledge bases developed by graduate students from the Mechanical and Aerospace Department, WVU. Supervised all graduate students in the project.

Results: working versions of the DICEtalk system including inference engine, inference debugger, knowledge description language compiler, graphical user interface.

Objectworks/Smalltalk: 25,100 lines (only Smalltalk methods, not counting class definitions of knowledge bases);

Smalltalk/V Mac: 21,800 lines of (only Smalltalk methods, not counting class definitions of knowledge bases).

Smalltalk/V: 22,300 lines (only Smalltalk methods, not counting class definitions of knowledge bases).

Hardware: IBM PC, Mac, SUN4, SPARC2, DEC5000, HP.

Software: Objectworks/Smalltalk, Smalltalk/V Mac, Smalltalk/V.

13. Project: Expertalk (Technowiedza Inc.)

As an owner of Technowiedza Inc., architect and lead developer (1988-1989) of the Expertalk knowledge-based environment, responsible for the design, implementation, and delivery of Expertalk to research institutes in Poland.

Results: a commercial version of the Expertalk system including inference engine, knowledge description language compiler, graphical user interface, 19,000 lines of Smalltalk/V code.

Hardware: IBM PC-XT/AT.

Software: Smalltalk/V.

14. Project: Smalltalk-80 (MERA-STER Inc.)

1987-1988: Project Manager (the head of the project).

Responsible (with six other persons) for the design and implementation of the Smalltalk-80 system for MERA-400 platforms.

Results: the first initial implementation of Smalltalk-80 for Polish computers.

Hardware: MERA-400.

Software: LOGLAN, MERA assembler.

15. Project: Knowledge-based Systems/Research and Applications (Polish Government)

1983-1988: Head, Expert Systems Laboratory, Department of Methodology of Information Processing, Institute of Biocybernetics and Biomedical Engineering.

Responsible (with other six persons) for design and implementation of several experimental expert systems for medical applications.

Results: the first implementation of percept knowledge description language and several experimental medical knowledge-based applications.

Hardware: IBM PC-XT/AT.

Software: C, Prolog, M1.

16. Project: CPO (Polish Government)

1982-1983: Head, Picture Recognition and Processing Department, Institute of Biocybernetics and Biomedical Engineering.

1976-1982: Head, Pattern Recognition Methodology Laboratory, Department of Picture Recognition and Processing, Institute of Biocybernetics and Biomedical Engineering.

Responsible (with group of 10-20 persons) for architecture, design, hardware, and software for a digital image processing and pattern recognition system.

Results: a library of graphical routines (PICASSO-SHOW) and pattern recognition system (partially results of my Ph.D. Thesis), running on CPO/ODRA1204 and CPO2/K202 systems, available for all researcher in Poland and Europe.

Hardware: ODRA1204, K202.

Software: ALGOL1204, ASSK assembler.

17. Project: Automatic Character Recognition (Polish Government)

As an architect and lead developer (1971-1974) of a automatic character reader, responsible for implementation of a family of learning algorithms for character recognition with high level noise.

Results: a family of learning algorithms for feature detection and character recognition used later to design hardware devices.

Hardware: ODRA1204.

Software: ALGOL1204.

18. Project: Recognizing of Signals of Electro-Paramagnetic Resonance (Russian Government)

As a designer and lead developer (1970-1971) of a microprogramming device, responsible for implementation of a family of learning algorithms for recognizing of signals of electro-paramagnetic resonance.

Results: the program for recognizing of signals of electro-paramagnetic resonance used at the (Russian) LUNA 10 space station (part of my M.S. Thesis).

Hardware: MINSK.

Software: assembler.

MAIN REFEREED PUBLICATIONS

1. M. Sobolewski, Multifidelity Service Systems, (keynote), ITNT 2018, Samara, Russia, April 2018
2. M. Sobolewski, Amorphous transdisciplinary service systems. Int. J. Agile Systems and Management, Vol. 10, No. 2, 2017, Int. J. Agile Systems and Management, Vol. 10, No. 2, 2017, pp. 93-114
3. M. Sobolewski, Amorphous Transdisciplinary Engineering: Object Orientation Meets Service Orientation with Emergent Multifidelity Management. Transdisciplinary Engineering: Crossing Boundaries M. Borsato et al. (Eds.), pp. 871-882, IOS Press 2016. Available at: <http://ebooks.iospress.nl/volumearticle/45473>

4. M. Sobolewski, Amorphous Computer-aided Engineering Systems (Keynote), Proceedings of Intl. Conference on *Methods & Tools for CAE - concepts and applications*, pp. 15-32, Warsaw University of Technology, Institute of Machine Design Fundamentals, 2015. Conference site at: <http://mt-for-cae.sm.pl/index.php/mtcae/index>
5. M. Sobolewski & R. Kolonay, Service-oriented Life Cycles for Developing Transdisciplinary Engineering Systems, in *Transdisciplinary Lifecycle Analysis of Systems*, Vol. 2, ISBN 978-1-61499-543-2 (print) | 978-1-61499-544-9 (online), IOS Press 2015, pp. 541 – 551. Available at: <http://ebooks.iospress.nl/volumearticle/40007>
6. Sobolewski, *Technology Foundations. Concurrent Engineering in the 21st Century*, Springer International Publishing, pp. 67-99, 2015, http://dx.doi.org/10.1007/978-3-319-13776-6_4
7. M. Sobolewski, Unifying Front-end and Back-end Federated Services for Integrated Product Development. *Moving Integrated Product Development to Service Clouds in the Global Economy*, J. Cha et al. (Eds.), DOI10.3233/978-1-61499-440-4-3, IOS Press, pp. 3 - 16, 2014. Available at: <http://ebooks.iospress.nl/volumearticle/37838>
8. M. Sobolewski, Service Oriented Computing Platform: An Architectural Case Study. *Handbook of Research on Architectural Trends in Service-Driven Computing*, R. Ramanathan and K. Raja (Eds.), Vol. 1, Chapter 10. Hershey, PA: IGI Global. doi:10.4018/978-1-4666-6178-3. Available at: <http://www.igi-global.com/chapter/a-service-oriented-computing-platform/115430>
9. M. Sobolewski, S. Burton, and R. Kolonay, Parametric Mogramming with Var-oriented Modeling and Exertion-Oriented Programming Languages, 20th ISPE International Conference on Concurrent Engineering, C. Bil et al. (Eds.), pp. 381-390, ISBN: 978-1-61499-301-8 (print), 978-1-61499-302-5 (online), IOS Press, 2013. Retrieved September 15, 2013, <http://ebooks.iospress.nl/book/20th-ispe-international-conference-on-concurrent-engineering>
10. M. Sobolewski and R. Kolonay, Service-oriented Programming for Design Space Exploration, J. Stjepandic at al. (eds.), *Concurrent Engineering Approaches for Sustainable Product Development in a Multidisciplinary Environment*, pp. 995-1007, Vol 2, DOI: 10.1007/978-1-4471-4426-7_84, Springer-Verlag London, 2013.
11. M. Sobolewski and R. Kolonay, Unified Mogramming with Var-Oriented Modeling and Exertion-Oriented Programming Languages, *Int. J. Communications, Network and System Sciences*, 2012, 5, 9, Published Online September 2012 (<http://www.scirp.org/journal/PaperInformation.aspx?paperID=22393>)
12. Sobolewski, M., Object-Oriented Service Clouds for Transdisciplinary Computing in *Cloud Computing and Services Science*, (Eds.) I. Ivanov, M. van Sinderen, B. Shishkov, Springer, ISBN 978-1-4614-2325-6, 2012, pp. 3-32.
13. Kolonay, R. M. & Sobolewski, M., Service ORiented Computing EnviRonment (SORCER) for Large Scale, Distributed, Dynamic Fidelity Aeroelastic Analysis & Optimization, International Forum on Aeroelasticity and Structural Dynamics, IFASD2011, 26-30 June, Paris, France.
14. M. Sobolewski, (Keynote), Provisioning Object-oriented Service Clouds for Exertion-oriented Programming. The 1st International Conference on Cloud

Computing and Services Science, CLOSER 2011, Noordwijkerhout, the Netherlands, 7-9 May 2011, SSRI, Springer-Verlag.

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