

Michal Sojka

Curriculum Vitae

Personal Details

Contact *E-mail:* michal.sojka@cvut.cz
Other *Born:* 28. 10. 1978 in Prague
 Citizenship: Czech Republic
 Marital Status: Married, 3 children
 Sex: Male

Education

2003 – 2011 *Ph.D., Control Engineering and Robotics, Czech Technical University in Prague*
 Thesis: Resource Reservations and Analysis in Heterogeneous and Distributed
 Real-Time Systems
 Adviser: Doc. Zdeněk Hanzálek
1997 – 2003 *Ing. (M.Sc. equivalent), Control Engineering & Cybernetics, Czech Technical University*
 in Prague
 Thesis: Implementation of Ethernet interface for control applications
 Adviser: Ing. Pavel Píša
1993 – 1997 Grammar school Arabská, Prague
 Course: programming

Working Experience

2017 – present Research group leader
 Czech Institute of Informatics, Robotics and Cybernetics (CIIRC), Czech Technical Uni-
 versity in Prague

- EIT UM project IPA2X (Intelligent Pedestrian Assistant to Everyone)
- H2020 CleanSky Project THERMAC (Thermal-aware Resource Management for Modern Computing Platforms in the Next Generation of Aircraft)
- Industrial cooperation: Škoda (simulators of PDC/PLA, combustion engines, wire-
less tire-pressure sensors (RDK)), Porsche (ROS2 development), ...
- Teaching: Operating systems, Efficient software, Real-time systems programming

2012 – 2017 Assistant professor
 Dept. of Control Engineering, Faculty of Electrical Engineering, Czech Technical Uni-
 versity in Prague

- EU project HERCULES (High-Performance Real-time Architectures for Low-Power
Embedded Systems)
- Managing of ARTEMIS project SESAMO (Security and Safety Modelling)
- Industrial cooperation: Volkswagen (V2X communication), Eaton (code genera-
tor for safety systems), Porsche, ...

2006 – 2020 Embedded systems developer at Merica s.r.o.

- Mobile robot control software for Skoda Auto.
- Development and porting of industrial communication protocols for use in a
safety-critical railway application.
- Consulting

2011 – 2012 Postdoc researcher
 Operating systems group (prof. Härtig), TU Dresden, Germany.

- Work on virtualization platform with small trusted computing base, i.e. virtualization based on micro-hypervisor and minimalistic user-level environment.
 - European project PASSIVE.
- 2003 – 2011 Research assistant
Center for Applied Cybernetics, Czech Technical University in Prague
- European projects OCERA and FRESCOR (real-time computing).
 - Leader of a successful team in Eurobot contest.
 - Adviser of cca 20 diploma/bachelor theses.
 - Teaching: Discrete Event Systems, Real-Time Systems Programming, Open-Source Programming
- 2009 VxWorks consultant for Rockwell Automation
- 1998 – 2003 Software designer and developer at Planetarium Prague
- Laser projection control system,
 - Radio telescope control system,
 - Employee attendance tracking and payroll reporting system,
 - Interactive demonstrators, etc.

Languages

- Czech – native
English – fluent
German – intermediate

Computer Skills

Programming Languages:

- C, C++, Julia, Assembler (x86, ARM, PowerPC, H8, Z80), Python, Matlab, UNIX Shell, PHP, GNU Make, Perl – *Advanced level*
- Rust, Go, Lisp, Haskell – *Basic level*

Operating systems:

- GNU/Linux, VxWorks, NOVA

Technologies & Software:

- CAN, DocBook, HTML, CSS, IEEE 802.11, \LaTeX , LIN, ProfiBus, SQL, TCP/IP, USB, Virtualization, XML, XSLT
- Git, Nix
- Julia, Simulink, various office and graphics/DTP software
- Administration of UNIX systems

Open Source – active contributor to several projects. Among others:

- Nixpkgs – collection of software packages for functional package manager Nix
- Emacs – author of few packages (meson-mode, amc-txt-mode)
- Julia – author of and contributor to several packages (Gnuplot.jl, EmacsVterm.jl)
- Linux kernel – USB 2.0 isochronous transfer (for Linux 2.5)
- Notmuch (email system)

Selected Publications

Journal Papers

J. Matějka, B. Forsberg, **M. Sojka**, P. Šůcha, L. Benini, A. Marongiu, and Z. Hanzálek, “Combining prem compilation and static scheduling for high-performance and predictable mpso execution,” *Parallel Computing*, vol. 85, July 2019. [Online]. Available: <http://rttime.felk.cvut.cz/publications/public/PARCO2019.pdf>

P. Burgio, M. Bertogna, N. Capodiecici, R. Cavicchioli, **M. Sojka**, P. Houdek, A. Marongiu, P. Gai, C. Scordino, and B. Morelli, “A software stack for next-generation automotive systems on many-core heterogeneous platforms,” *Microprocessors and Microsystems*, vol. 52, July 2017.

M. Sojka, P. Píša, D. Faggioli, T. Cucinotta, F. Checconi, Z. Hanzálek, and G. Lipari, “Modular software architecture for flexible reservation mechanisms on heterogeneous resources,” *Journal of Systems Architecture*, vol. 57, no. 4, April 2011. [Online]. Available: <http://dx.doi.org/10.1016/j.sysarc.2011.02.005>

Conference Papers

J. Klapálek, **M. Sojka**, and Z. Hanzálek, “Comparison of control approaches for autonomous race car model,” in *Proceedings of the FISITA 2021 World Congress*. London, GB: FISITA - International Federation of Automotive Engineering Societies, 2021.

J. Klapálek, A. Novák, **M. Sojka**, and Z. Hanzálek, “Car racing line optimization with genetic algorithm using approximate homeomorphism,” in *2021 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*. Piscataway, US: IEEE, 2021.

J. Záhora, **M. Sojka**, and Z. Hanzálek, “Perception, planning and control system for automated slalom with porsche panamera,” in *Proceedings of the FISITA 2021 World Congress*. London, GB: FISITA - International Federation of Automotive Engineering Societies, 2021. [Online]. Available: https://rttime.ciirc.cvut.cz/hanzalek/publications/fisita-panamera_draft.pdf

M. Sojka, O. Benedikt, and Z. Hanzálek, “Work-in-progress: Determining mpso layout from thermal camera images,” in *EMSOFT '21: Proceedings of the 2021 International Conference on Embedded Software*. New York, US: Association for Computing Machinery, 2021. [Online]. Available: <https://dl.acm.org/doi/10.1145/3477244.3477619>

M. Košťál and **M. Sojka**, “Register file management for pret machines: Work-in-progress,” in *Proceedings of the 2021 International Conference on Hardware/Software Codesign and System Synthesis*. New York, US: Association for Computing Machinery, 2021.

—, “Pret-ization of urisc core,” in *Proceedings of the 16th Conference on Computer Science and Intelligence Systems*, vol. 25. Vienna, AT: IEEE Industrial Electronic Society, 2021. [Online]. Available: https://annals-csis.org/Volume_25/drp/pdf/126.pdf

M. Sojka, O. Benedikt, Z. Hanzálek, and P. Zaykov, “Testbed for thermal and performance analysis in mpso systems,” in *Proceedings of the 2020 Federated Conference on Computer Science and Information Systems, FedCSIS 2020*, vol. 21. Sofia: Institute of Electrical and Electronics Engineers, Inc., 2020. [Online]. Available: <https://annals-csis.org/proceedings/2020/drp/pdf/174.pdf>

J. Vlasák, **M. Sojka**, and Z. Hanzálek, “Accelerated rrt* and its evaluation on autonomous parking,” in *Proceedings of the 5th International Conference on Vehicle Technology and Intelligent Transport Systems*. Madeira, PT: SciTePress, 2019.

F. Kreiliger, J. Matějka, **M. Sojka**, and Z. Hanzálek, “Experiments for predictable execution of gpu kernels,” in *PROCEEDINGS OF OSPERT 2019 the 15th Annual Workshop on Operating Systems Platforms for Embedded Real-Time Applications*. Dresden, DE: TU Dresden, 2019. [Online]. Available: <https://ospert19.tudos.org/ospert19-proceedings.pdf>

J. Matějka, Z. Hanzálek, B. Forsberg, L. Benini, **M. Sojka**, and A. Marongiu, “Combining prem compilation and ilp scheduling for high-performance and predictable mpso execution,” in *Proceedings of the 9th International Workshop on Programming Models and Applications for Multicores and Manycores*. New York, US: Association for Computing Machinery, 2018.

- P. Houdek, **M. Sojka**, and Z. Hanzálek, “Towards predictable execution model on arm-based heterogeneous platforms,” in *Proceedings of the 26th IEEE International Symposium on Industrial Electronics*. Piscataway, NJ, US: IEEE, 2017.
- P. Burgio, M. Bertogna, I. S. Olmedo, P. Gai, A. Marongiu, and **M. Sojka**, “A software stack for next-generation automotive systems on many-core heterogeneous platforms,” in *Proceedings - 19th Euromicro Conference on Digital System Design*. Sangt Augustin, DE: Euromicro, 2016. [Online]. Available: <http://ieeexplore.ieee.org/document/7723535/>
- M. Sojka** and K. Kočí, “Configuring lowest latency kernel,” in *Proceedings of the 17th Real Time Linux Workshop*. Schopfloch, DE: Open Source Automation Development Lab, 2015.
- P. Píša, J. Yang, and **M. Sojka**, “Qemu can controller emulation with connection to a host system can bus,” in *Proceedings of the 17th Real Time Linux Workshop*. Schopfloch, DE: Open Source Automation Development Lab, 2015.
- M. Sojka** and P. Píša, “Usable simulink embedded coder target for linux,” in *16th Real Time Linux Workshop*. Schopfloch, DE: Open Source Automation Development Lab, 2014.
- A. Bruni, **M. Sojka**, F. Nielson, and H. Riis Nielson, “Formal security analysis of the macan protocol,” in *Integrated Formal Methods*. Cham, CH: Springer International Publishing AG, 2014.
- M. Sojka**, M. Kreč, and Z. Hanzálek, “Case study on combined validation of safety & security requirements,” in *Proceedings of the 9th IEEE International Symposium on Industrial Embedded Systems*. Piscataway, US: IEEE, 2014.
- M. Sojka**, P. Píša, and Z. Hanzálek, “Performance evaluation of linux can-related system calls,” in *Proceedings of the 10th IEEE International Workshop on Factory Communication Systems*. Piscataway, US: IEEE, 2014.
- M. Vajnar, **M. Sojka**, and P. Píša, “Porting of real-time publish-subscribe middleware to android,” in *15th Real-Time Linux Workshop*. Schopfloch, DE: Open Source Automation Development Lab, 2013. [Online]. Available: <https://rttime.felk.cvut.cz/publications/public/rtlws2013-orte-android.pdf>
- R. Lisový, **M. Sojka**, and Z. Hanzálek, “Pci express as a killer of software-based real-time ethernet,” in *The 12th International Workshop on Real-Time Networks*. Sangt Augustin, DE: Euromicro, 2013.
- P. Píša, R. Lisový, O. Hartkopp, and **M. Sojka**, “Uart-based lin-bus support for linux with socketcan interface,” in *Fourteenth Real-Time Linux Workshop*. Schramberg, DE: Open Source Automation Development Lab eG, 2012.
- S. Waechtler and **M. Sojka**, “Operating system noise: Linux vs. microkernel,” in *Fourteenth Real-Time Linux Workshop*. Schramberg, DE: Open Source Automation Development Lab eG, 2012.
- M. Sojka**, P. Píša, O. Špinka, and Z. Hanzálek, “Measurement automation and result processing in timing analysis of a linux-based can-to-can gateway,” in *IDAACS'2011 - Proceedings of the 6th IEEE International Conference on Intelligent Data Acquisition and Advanced Computing Systems*. Prague, CZ: IEEE, THEY, CTU, 2011.
- M. Sojka**, P. Píša, O. Špinka, O. Hartkopp, and Z. Hanzálek, “Timing analysis of a linux-based can-to-can gateway,” in *Thirteenth Real-Time Linux Workshop*. Schramberg, DE: Open Source Automation Development Lab eG, 2011. [Online]. Available: <http://lwn.net/images/conf/rtlws-2011/proc/Sojka.pdf>
- M. Sojka**, P. Píša, M. Petera, O. Špinka, and Z. Hanzálek, “A comparison of linux can drivers and their applications,” in *5th IEEE International Symposium on Industrial Embedded Systems*. Piscataway, NJ, US: IEEE, 2010.
- M. Sojka** and Z. Hanzálek, “Modular architecture for real-time contract-based framework,” in *IEEE Symposium on Industrial Embedded Systems, Proceedings of*. Piscataway, US: IEEE, 2009.
- M. Sojka** and P. Píša, “Timing analysis of linux can drivers,” in *Eleventh Real-Time Linux Workshop*. Schopfloch, DE: Open Source Automation Development Lab, 2009.

M. Sojka, “Mobilní robot pro soutěž eurobot,” in *Kolokvium vestavěných systémů 2009*. Praha, CZ: Centrum aplikované kybernetiky, 2009.

M. Sojka, M. Molnár, and Z. Hanzálek, “Experiments for real-time communication contracts in ieee 802.11e edca networks,” in *Proceedings of 2008 IEEE International Workshop on Factory Communication Systems*. Piscataway, US: IEEE, 2008.

M. Sojka and M. Molnár, “Bezdrátové sítě ieee 802.11 v kontraktovém frameworku,” in *Kolokvium vestavěných systémů 2008*. Praha, CZ: Centrum aplikované kybernetiky, 2008.

M. Peca, **M. Sojka**, and Z. Hanzálek, “Spejbl - the biped walking robot,” in *Preprints 7th IFAC International Conference on Fieldbuses and nETworks in industrial and embedded systems*. Toulouse, FR: Université Toulouse, 2007.

P. Šůcha, M. Kutil, **M. Sojka**, and Z. Hanzálek, “Torsche scheduling toolbox for matlab,” in *IEEE Symposium on Computer-Aided Control System Design 2006*. Piscataway, US: IEEE, 2006.

O. Špinko, J. Krákora, **M. Sojka**, and Z. Hanzálek, “Low-cost avionics system for ultra-light aircraft,” in *ETFA 2006 Proceedings*. Piscataway, US: IEEE, 2006.

M. Sojka, “Optimization based approach to response-time analysis for tasks with offsets,” in *POSTER 2006*. Praha, CZ: České vysoké učení technické v Praze, 2006.

M. Sojka and O. Špinko, “Ecs deployment and validation,” in *Proceedings of the Graduate Course on Embedded Control Systems*. Valencia, ES: Universidad Politécnica de Valencia, 2005.

M. Sojka, “Distributed model-checking for real-time system verification,” in *8th International Student Conference on Electrical Engineering, POSTER 2004, May 20 2004, Prague*. Praha, CZ: ČVUT v Praze, FEL, 2004.

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Technical Reports

M. Sojka, R. Lisový, and P. Píša, “SocketCAN and queueing disciplines,” Czech Technical University in Prague, Tech. Rep., 2011, study for Volkswagen, aG.

Interests Music – I play dobro, bass guitar and guitar. I was a member of several amateur bands.
Hiking, Cycling

Prague, April 19, 2022