Borislav NIKOLIĆ

CONTACT DETAILS

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CURRENT POSITION

PRESENT – DEC 2019
Associate Professor — *Univerzitet Metropolitan Beograd, Serbia*
Faculty of Information Technologies (www. metropolitan.ac.rs)

PREVIOUS POSITIONS

MAR 2020 – MAR 2017
Consultant — *Technische Universität Braunschweig, Germany*
Innovationsgesellschaft Technische Universität Braunschweig mbH (www.itubs.de)

MAR 2020 – DEC 2016
Post-Doctoral Researcher — *Technische Universität Braunschweig, Germany*
Institute of Computer and Network Engineering (www.ida.ing.tu-bs.de)

DEC 2016 – APR 2015
Post-Doctoral Researcher — *Instituto Politécnico do Porto, Portugal*
Research Centre in Real-Time and Embedded Computing Systems (www.cister.isep.ipp.pt)

APR 2015 – SEP 2010
Doctoral Researcher — *Instituto Politécnico do Porto, Portugal*
Research Centre in Real-Time and Embedded Computing Systems (www.cister.isep.ipp.pt)

JUN 2010 – DEC 2008
Software Developer — *Comtrade, Serbia*
Spinnaker New Technologies (www.comtrade.com)

EDUCATION

APR 2015 – SEP 2010
Ph.D. in Computer Science — *Universidade do Porto, Portugal*
Thesis title: Many-Core Platforms in the Real-Time Embedded Computing Domain
Advisor: Dr. Stefan M. Petters

APR 2014 – JAN 2014
Visiting Ph.D. Student — *University of York, England*
Host: Real-Time Systems Research Group
Advisor: Dr. Leandro Soares Indrusiak

OCT 2007 – OCT 2001
Engineer of Electrical Engineering — *University of Belgrade, Serbia*
(equivalent to BSc + MSc degree)
GPA: 8.83/10 (88.3%)

CURRENT AND PAST RESEARCH PROJECTS

MAR 2020 – JUN 2019 | **Consultant** | *Mixed-Criticality System Architecture for Embedded Systems and Edge Computing*

Consortium: iTUBS, HUAWEI
Objective: Methods for resource sharing and control in automotive networks.

MAR 2020 – FEB 2019 | **Co-supervisor of a PhD student** | *ERIKA (www.erika-projekt.de)*

Consortium: TU Braunschweig, BMW, NXP, TU Chemnitz, Continental, HHI, Technica, Porsche, FKFS
Objective: Methods for OFDM-based communication in automotive networks.

MAR 2020 – MAR 2018 | **Co-supervisor of a PhD student** | *The Information Processing Factory (ipf.ics.uci.edu)*

Consortium: TU Braunschweig, TU München, University of California (Irvine)
Objective: Methods for autonomous MPSoC platforms in cyber-physical systems.

MAR 2020 – FEB 2018 | **Task 1 Leader (Foundations)** | *RT-Proofs (rt-proofs.inria.fr)*

Consortium: TU Braunschweig, INRIA, MPI-SWS, Onera, Verimag
Objective: Foundations for computer-assisted formal verification of timing analysis.

MAY 2019 – MAR 2017 | **Project Manager** | *Cross-Protocol High-Speed Data Switching*

Consortium: iTUBS, NXP
Objective: Design and methodologies for next-generation automotive networks.

MAR 2019 – NOV 2018 | **Consultant** | *Ethernet in Highly Automated Automotive Vehicles*

Consortium: iTUBS, Volkswagen
Objective: Redundancy and fail-operational concepts for automotive networks.

MAY 2018 – DEC 2016 | **Work Package 8 Leader (Dissemination)** | *SAFURE (www.safure.eu)*

Consortium: TU Braunschweig, Technikon, Escrypt, Magneti Marelli, TTTech, Sysgo, Symta Vision, Thales, BSC, SSSA, ETH Zürich
Objective: Methods for safety & security for interconnected mixed-critical systems.

DEC 2016 – APR 2015 | **Work Package 4 (Schedulability)** | *P-SOCRATES (p-socrates.github.io)*

Consortium: ISEP, BSC, University of Modena, ETH Zürich, Evidence, Active Technologies, Atos
Objective: Framework for development of parallel real-time applications.

INVITED TALKS AND SEMINARS

JUL 2019 | **Keynote speaker** "Safety and Security Aspects of Ethernet and TSN" at *4th International Workshop on Security and Dependability of Critical Embedded Real-Time Systems (CERTS)*, Stuttgart, Germany.

NOV 2018 | **Invited speaker** "Automotive Ethernet – Present and Future" at *The Future of Automotive Networking Workshop*, HUAWEI Munich Research Center, Germany.

DEC 2017	**Invited speaker** "Mixed Criticality Systems: A History of Misconceptions" at *Workshop on Mixed Criticality Systems (WMC)*, Paris, France.
JUL 2017	**Invited speaker** "Envisioned Challenges of the Automotive Domain" at *DREAMS Project Meeting* (*www.dreams-project.eu*), Cologne, Germany.
JUN 2019	**Invited seminar** "Slot-Based Transmission Protocol for Real-Time NoCs – SBT-NoC" at INRIA Grenoble Rhône-Alpes, France, invited by Dr. Sophie Quinton.
JAN 2014	**Invited seminar** "Limited Migrative Model: Concepts and Applications in Real-Time Embedded Computing Domain" at RTS Group of University of York, England, invited by Dr. Leandro Soares Indrusiak.

AWARDS & GRANTS

JUL 2019	**Best Paper Award** at *31st Euromicro Conference on Real-Time Systems (ECRTS)* for the paper "Slot-Based Transmission Protocol for Real-Time NoCs – SBT-NoC" [C15].
MAR 2018	**Best Paper Award** at *21st Design, Automation and Test in Europe Conference (DATE)* for the paper "Buffer-Aware Bounds to Multi-Point Progressive Blocking in Priority-Preemptive NoCs" [C12].
AUG 2014	**Best Paper Award Candidate** at *20th IEEE International Conference on Embedded and Real-Time Computing Systems and Applications (RTCSA)* for the paper "Worst-Case Communication Delay Analysis for Many-Cores using a Limited Migrative Model" [C5].
AUG 2018	**Outstanding Paper Award** at *24th IEEE International Conference on Embedded and Real-Time Computing Systems and Applications (RTCSA)* for the paper "Supporting Dynamic Voltage and Frequency Scaling in Networks-On-Chip for Hard Real-Time Systems" [C13].
FEB 2018	**Appointed Collector** of Dagstuhl Seminar 18092 "The Logical Execution Time Paradigm: New Perspectives for Multicore Systems".
APR 2015 JAN 2012	**Doctoral Scholarship** awarded by Portuguese national funding agency FCT (*www.fct.pt*).

SERVICES TO RESEARCH COMMUNITY

Thesis

- **External reviewer** at Filipe Monteiro Master defence, "Clock Synchronization for Many-Core Processors", University of Porto. Advisor: Prof. Pedro Souto (20th October 2016).

Projects

- **External reviewer** of Project DREAMS (*www.dreams-project.eu*) at project meeting in Cologne, Germany (7th July 2017).

Technical Program Committee Member

- **DREAMCloud** 2016: International Workshop on Dynamic Resource Allocation and Management in Embedded, High Performance and Cloud Computing
- **ECRTS-WIP** 2017: Euromicro Conference on Real-Time Systems – WIP Session
- **ETFA** 2021: IEEE Conference on Emerging Technologies and Factory Automation (ETFA)
- **IECON** 2018 – 2019: Annual Conference of the IEEE Industrial Electronics Society, Special Session on Emerging Solutions for Vehicular Embedded Systems
- **JRWRTC** 2015, 2017, 2019: Junior Researcher Workshop on Real-Time Computing
- **RTAS-WIP** 2016: IEEE Real-Time Embedded Technology & Applications Symposium – WIP Session
- **RTN** 2018 – 2019: International Workshop on Real-Time Networks
- **SEAA** 2016 – 2017: Euromicro Conference on Software Engineering and Advanced Applications
- **WFCS** 2020: IEEE International Conference on Factory Communication Systems

Reviewer of International Journals

- ACM Transactions on Architecture and Code Optimization (TACO) • ACM Transactions on Embedded Computing Systems (TECS) • IEEE Embedded Systems Letters (ESL) • IEEE Transactions on Industrial Informatics • Journal of Systems Architecture: Embedded Software Design (JSA) • Leibniz Transactions on Embedded Systems (LTES) • Microprocessors and Microsystems: Embedded Hardware Design (MICPRO) • National Academy Science Letters • Real-Time Systems Journal (RTSJ)

Reviewer of International Conferences

- ACM SIGBED International Conference on Embedded Software (EMSOFT) • Conference of the IEEE Industrial Electronics Society, Special Session on Emerging Solutions for Vehicular Embedded Systems (IECON) • Design, Automation and Test in Europe Conference (DATE) • Euromicro Conference on Real-Time Systems (ECRTS) • Euromicro Conference on Software Engineering and Advanced Applications (SEAA) • IEEE Conference on Emerging Technologies and Factory Automation (ETFA) • IEEE International Conference on Embedded and Real-Time Computing Systems and Applications (RTCSA) • IEEE International Conference on Factory Communication Systems (WFCS) • IEEE International Symposium on Industrial Embedded Systems (SIES) • IEEE Real-Time Systems Symposium (RTSS) • IEEE Real Time Technology and Applications Symposium (RTAS) • International Conference on Architecture of Computing Systems (ARCS) • International Conference on Real-Time Networks and Systems (RTNS) • International Workshop on Real-Time Networks (RTN) • Junior Researcher Workshop on Real-Time Computing (JRWRTC)

LANGUAGES

SERBIAN:	Native language
ENGLISH:	Fluent – TOEFL iBT 105/120 (February 2010)
GERMAN:	B1
PORTUGUESE:	A2

MORE

INTERESTS:	sport, technology, travelling.
HOBBIES:	road cycling, football, sci-fi books & movies, card games.

PUBLICATIONS

International Journals

[J9] A. Burmyakov, B. Nikolić. "An exact comparison of global, partitioned, and semi-partitioned fixed-priority real-time multiprocessor schedulers". In *The Journal of Systems Architecture: Embedded Software Design (JSA)*, volume 121, December 2021.

[J8] M.A. Ojewale, P.M. Yomsi, B. Nikolić. "Worst-case traversal time analysis of TSN with multi-level preemption". In *The Journal of Systems Architecture: Embedded Software Design (JSA)*, volume 116, June 2021.

[J7] R. Hofmann, B. Nikolić, R. Ernst. "Challenges and Limitations of IEEE 802.1CB-2017". In *IEEE Embedded Systems Letters (ESL)*, volume 12, issue 4, 2020.

[J6] J. Loureiro, R. Rangarajan, B. Nikolić, L.S. Indrusiak, E. Tovar. "Extensive Analysis of a Real-Time Dense Wired Sensor Network Based on Traffic Shaping". In *ACM Transactions on Cyber-Physical Systems (TCPS)*, volume 3, issue 3, August 2019.

[J5] B. Nikolić, S. Tobuschat, L.S. Indrusiak, R. Ernst, A. Burns. "Real-time analysis of priority-preemptive NoCs with arbitrary buffer sizes and router delays". In *Real-Time Systems Journal (RTSJ)*, volume 55, issue 1, January 2019.

[J4] B. Nikolić, L.M. Pinho. "Optimal minimal routing and priority assignment for priority-preemptive real-time NoCs". In *Real-Time Systems Journal (RTSJ)*, volume 53, issue 4, July 2017.

[J3] B. Nikolić, P.M. Yomsi, S.M. Petters. "Worst-Case Communication Delay Analysis for NoC-based Many-Cores using a Limited Migrative Model". In *Journal of Signal Processing Systems (JSPS)*, volume 84, issue 1, July 2016.

[J2] B. Nikolić, S.M. Petters. "Real-Time Application Mapping for Many-Cores Using a Limited Migrative Model". In *Real-Time Systems Journal (RTSJ)*, volume 51, issue 3, June 2015.

[J1] D. Dasari, B. Nikolić, V. Nélis, S.M. Petters. "NoC Contention Analysis using a Branch and Prune Algorithm". In *ACM Transactions on Embedded Computing Systems (TECS)*, volume 13, issue 3s, March 2014.

International Conferences

[C18] M.A. Ojewale, P.M. Yomsi, B. Nikolić. "Multi-Level Preemption in TSN: Feasibility and Requirements Analysis". In *23rd IEEE International Symposium on Real-Time Distributed Computing (ISORC 2020)*. Acceptance rate = 44.1% (34 submissions, 15 accepted full papers).

[C17] T. Kadeed, B. Nikolić, R. Ernst. "Safe Online Reconfiguration of Mixed-Criticality Real-Time Systems". In *25th IEEE Pacific Rim International Symposium on Dependable Computing*

(PRDC 2020). Acceptance rate = 40.9% (44 submissions, 18 accepted papers).

[C16] R. Hofmann, B. Nikolić, R. Ernst. "Slack-based Traffic Shaping for Real-time Ethernet Networks". In *25th IEEE International Conference on Embedded and Real-Time Computing Systems and Applications (RTCSA 2019)*. Acceptance rate = 30.0% (50 submissions, 15 accepted full papers).

[C15] B. Nikolić, R. Hofmann, R. Ernst. "Slot-Based Transmission Protocol for Real-Time NoCs – SBT-NoC". In *31st Euromicro Conference on Real-Time Systems (ECRTS 2019)*. **Best paper award**. Acceptance rate = 33.7% (80 submissions, 27 accepted papers).

[C14] L. Köhler, B. Nikolić, Rolf Ernst, Marc Boyer. "Increasing Accuracy of Timing Models: From CPA to CPA+". *In 22nd Design, Automation and Test in Europe Conference (DATE 2019)*. Acceptance rate = 24.2% (834 submissions, 202 accepted papers).

[C13] A. Kostrzewa, T. Kadeed, B. Nikolić, R. Ernst. "Supporting Dynamic Voltage and Frequency Scaling in Networks-On-Chip for Hard Real-Time Systems". In *24th IEEE International Conference on Embedded and Real-Time Computing Systems and Applications (RTCSA 2018)*. **Outstanding paper award**. Acceptance rate = 31.2% (48 submissions, 15 accepted full papers).

[C12] L.S. Indrusiak, A. Burns, B. Nikolić. "Buffer-aware bounds to multi-point progressive blocking in priority-preemptive NoCs". In *21st Design, Automation and Test in Europe Conference (DATE 2018)*. **Best paper award**. Acceptance rate = 24.1% (766 submissions, 185 accepted papers).

[C11] J. Loureiro, R. Rangarajan, B. Nikolić, L.S. Indrusiak, E. Tovar. "Real-time dense wired sensor network based on traffic shaping". In *23rd IEEE International Conference on Embedded and Real-Time Computing Systems and Applications (RTCSA 2017)*. Acceptance rate = 29.2% (65 submissions, 19 accepted full papers).

[C10] M. Becker, B. Nikolić, D. Dasari, B. Åkesson, V. Nélis, M. Benham, T. Nolte. "Partitioning and Analysis of the Network-on-Chip on a COTS Many-Core Platform". In *23rd IEEE Real-Time and Embedded Technology and Applications Symposium (RTAS 2017)*. Acceptance rate = 34.1% (85 submissions, 29 accepted papers).

[C9] B. Nikolić, L.M. Pinho, L.S. Indrusiak. "On Routing Flexibility of Wormhole-Switched Priority-Preemptive NoCs". In *22nd IEEE International Conference on Embedded and Real-Time Computing Systems and Applications (RTCSA 2016)*. Acceptance rate = 26.1% (69 submissions, 18 accepted full papers).

[C8] M. Becker, D. Dasari, B. Nikolić, B. Åkesson, V. Nélis, T. Nolte. "Contention-Free Execution of Automotive Applications on a Clustered Many-Core Platform". In *28th Euromicro Conference on Real-Time Systems (ECRTS 2016)*. Acceptance rate = 26% (92 submissions, 24 accepted papers).

[C7] B. Nikolić, K. Bletsas, S.M. Petters. "Hard real-time multiprocessor scheduling resilient to core failures". In *21st IEEE International Conference on Embedded and Real-Time Computing Systems and Applications (RTCSA 2015)*. Acceptance rate = 30.9% (68 submissions, 21 accepted full papers).

[C6] B. Nikolić, S.M. Petters. "EDF as an Arbitration Policy for Wormhole-Switched Priority-Preemptive NoCs - Myth or Fact?" In *14th International Conference on Embedded Software (EMSOFT 2014)*. Acceptance rate = 24.8% (117 submissions, 29 accepted papers).

[C5] B. Nikolić, P.M. Yomsi, S.M. Petters. "Worst-Case Communication Delay Analysis for Many-Cores using a Limited Migrative Model". In *20th IEEE International Conference on Embedded and Real-Time Computing Systems and Applications (RTCSA 2014)*. **Best paper award candidate**. Acceptance rate = 22.3% (175 submissions, 39 accepted full papers).

[C4] B. Nikolić, H. Ali, S.M. Petters, L.M. Pinho. "Are Virtual Channels the Bottleneck of Priority-Aware Wormhole-Switched NoC-Based Many-Cores?" In *21st International Conference on Real-Time Networks and Systems (RTNS 2013)*. Acceptance rate = 46.8% (62 submissions,

29 accepted papers).

[C3] B. Nikolić, P.M. Yomsi, S.M. Petters. “Worst-Case Memory Traffic Analysis for Many-Cores using a Limited Migrative Model”. In *19th IEEE International Conference on Embedded and Real-Time Computing Systems and Applications (RTCSA 2013)*. Acceptance rate = 29.1% (103 submissions, 30 accepted full papers).

[C2] B. Nikolić, S.M. Petters. “Towards network-on-chip agreement protocols”. In *12th International Conference on Embedded Software (EMSOFT 2012)*. Acceptance rate = 24.2% (95 submissions, 23 accepted papers).

[C1] B. Nikolić, M.A. Awan, S.M. Petters. “SPARTS: Simulator for Power Aware and Real-Time Systems”. In *8th IEEE International Conference on Embedded Software and Systems (ICESS 2011)*. Acceptance rate = 28.1% (185 submissions, 52 accepted papers).

White paper

[W1] G. Gala, G. Fohler, S. Barner, A. Diewald, R. Obermaisser, T. Koller, D. Gracia Perez, B. Nikolić, M. Coppola, M. Grammatikakis, A. Crespo, J. Coronel, K. Chappuis, G. Bouwer, G. Klaes, J. Perez, A. Larrucea. “White Paper on Mixed-Criticality Research and Innovation”. July 2017.

October 2022