2021 Ivannikov Ispras Open **Conference (ISPRAS 2021)**

Moscow, Russia 2 – 3 December 2021



IEEE Catalog Number: CFP21N36-POD **ISBN:**

978-1-6654-2331-1

Copyright © 2021 by the Institute of Electrical and Electronics Engineers, Inc. All Rights Reserved

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

*** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.

IEEE Catalog Number:	
ISBN (Print-On-Demand):	
ISBN (Online):	
ISSN:	

CFP21N36-POD 978-1-6654-2331-1 978-1-6654-2330-4 2767-9519

Additional Copies of This Publication Are Available From:

Curran Associates, Inc 57 Morehouse Lane Red Hook, NY 12571 USA Phone: (845) 758-0400 Fax: (845) 758-2633 E-mail: curran@proceedings.com Web: www.proceedings.com



2021 Ivannikov Ispras Open Conference (ISPRAS) **ISPRAS 2021**

Table of Contents

Conference Organizationix
Technologies of Program Analysis, Modeling and Transformation
Bin2Source: Matching Binary to Source Code
Exception Analysis for Errors Detection in the SharpChecker Static Analyzer for C#
Static Analyzer for Go
Information Leakage Prevention Based on the Separation of Encrypted and Compressed Data 26 Alexander Kozachok (Academy of the Federal Guard Service of the Russian Federation, Russian Federation), Andrey Spirin (Academy of the Federal Guard Service of the Russian Federation, Russian Federation), Vasiliy Kozachok (Academy of the Federal Guard Service of the Russian Federation, Russian Federation), and Daria Lavrova (Peter the Great St. Petersburg Polytechnic University (SPbPU), Russian Federation)
UEFI Virtual Machine Firmware Hardening Through Snapshots and Attack Surface Reduction . 30 Mikhail Krichanov (Ivannikov Institute for System Programming of the Russian Academy of Sciences, Russia) and Vitaly Cheptsov (Ivannikov Institute for System Programming of the Russian Academy of Sciences, Russia)
 MAJORCA: Multi-Architecture JOP and ROP Chain Assembler
Casr-Cluster: Crash Clustering for Linux Applications

 Specializing PostgreSQL Expression Interpreter with Code Annotations	
 Improving Accuracy and Completeness of Source Code Static Taint Analysis	
Cross-Platform Graphics Subsystem for an ARINC 653-Compatible Real-Time Operating System 69 Maksim Raenchuk (Ivannikov Institute for System Programming, Russia; Lomonosov Moscow State University, Russia), Vitaly Cheptsov (Ivannikov Institute for System Programming, Russia), and Alexey Khoroshilov (Ivannikov Institute for System Programming, Russia; Lomonosov Moscow State University, Russia)	
Symbolic Security Predicates: Hunt Program Weaknesses76Alexey Vishnyakov (Ivannikov Institute for System Programming of the76RAS), Vlada Logunova (Ivannikov Institute for System Programming of76the RAS; Moscow Institute of Physics and Technology, Russia), Eli76Kobrin (Ivannikov Institute for System Programming of the RAS;76Lomonosov Moscow State University), Daniil Kuts (Ivannikov Institute76for System Programming of the RAS), Darya Parygina (Ivannikov76Institute for System Programming of the RAS; Lomonosov Moscow State76University), and Andrey Fedotov (Ivannikov Institute for System76Programming of the RAS)76	

Management of Data and Information Systems

User-Centric Multiobjective Location of Electric Vehicle Charging Stations in a City-Scale Area
Search for an Object with a Recognition Error Probability in a Desktop Grid Environment 96 Evgeny Ivashko (Petrozavodsk State University, Russia) and Ilya Chernov (Petrozavodsk State University, Russia)
Effective and Efficient Summarization for Non-Hierarchical Data
The Automatic Approach for Scientific Papers Dating

Page Layout Analysis for Refining Table Extraction from PDF Documents
Bag of Tricks for Citation Intent Classification via SciBERT
Slurm PaaS in a Cloud Environment for Development and Debug Purposes
Automatic Contactless Weighing of Fish During Experiments
Paraphrase Quality Assessment Metric and Russian Paraphrase Dataset Collection
 Template-Based Generation of Entertaining Illustrations for News Publication in Social Media using Deep Neural Networks

Open Source Software in Continuum Mechanics Problems Solving

Quality Assessment of CFD Software using Workflows and Decision Trees Ilya Evdokimov (Helmholtz-Zentrum Dresden - Rossendorf) and Susann Haensch (Helmholtz-Zentrum Dresden - Rossendorf)	155
Numerical Investigation of Mesoscale Coherent Structures in Mediterranean sea Philippe Fraunié (Université de Toulon – Centre National Recherche Scientifique, France)	162
A Software Package for Flows Simulation in the Coastal Regions of the Kara and Barents Seas using Shallow Water Approximation Aleksandr Ivanov (Keldysh Institute of Applied Mathematics of the Russian Academy of Sciences, Ivannikov Institute for System Programming of the Russian Academy of Sciences, Russia)	165
The Energy Efficiency Research of Godunov Method on Intel Xeon Scalable Architecture Igor Kulikov (supercomputing lab., ICMMG SB RAS, Russia), Igor Chernykh (supercomputing lab., ICMMG SB RAS, Russia), Dmitry Karavaev (geophysical informatics lab., ICMMG SB RAS, Russia), and Anna Sapetina (supercomputing lab., ICMMG SB RAS, Russia)	170

Validation of a Newly Developed Implementation of the PFEM-2 Method using an Open-Source	
Framework	6
Andrey Popov (Bauman Moscow State Technical University, Russia), Ilia	
Marchevsky (Bauman Moscow State Technical University, Russia), and	
Georgy Serbin (Bauman Moscow State Technical University, Russia)	
fMRI Neurofeedback: Brain State Classification in Real Time	2