

Paul Irofti

Consultant
Operating Systems
Antivirus Technologies
Security Applications
Signal Processing
GPU Parallel Algorithms

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University of Bucharest,
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Education

Ph.D. in Systems Engineering,
thesis "*Parallel Dictionary Learning Algorithms for Sparse Representations*",
Polytechnic University of Bucharest, Bucharest, 2011–2015

Engineer, Computers and Automata Faculty,
Polytechnic University of Bucharest, Bucharest, 2003–2008

Mathematics and Computer Science, Saint Sava National College, Bucharest, 1999–2003

Waldorf School, Bucharest, 1991–1998

Fields of Interest

Reverse Engineering, Static and Dynamic Analysis, Operating Systems,
Signal Processing, Parallel Algorithms

Experience

University of Bucharest

Lecturer in the Department of Computer Science at the Faculty of Mathematics and Computer Science,
February 2018 – Present

Politehnica University of Bucharest

Postdoc at Faculty of Automatic Control and Computers, "Implementation and development of algorithms for the dynamic motion planning of robotic systems", CEC 2017 project, 2017

- Navigation algorithms for robotic systems
- Generate trajectories which fulfill optimally costs
- ROS-based Gazebo implementation for TurtleBot

Postdoc at Faculty of Automatic Control and Computers, "Set-theoretic approaches for fault tolerant control of complex systems", TE 2015 project, September 2015 - December 2017

- Sensor placement using sparse representations and dictionary learning
- Applications in water distribution networks

Research Assistant at Faculty of Automatic Control and Computers, "Sparse representations in signal processing", IDEI 2011 project, January 2014 - September 2016

- Parallel algorithms for sparse and redundant representations for dictionary learning and training
- Applications in image processing (reconstruction, compression, noise reduction etc.)
- Heterogenous implementations on the GPU and CPU via OpenCL

FileMedic

Project Lead: AntiMalware Emulator Implementation, 2011-2013
Build, Test and Report Infrastructure, autumn 2011 - spring 2012
Internal Telephony Infrastructure Setup, spring 2011
Static Antivirus Engines Development, winter 2010 - 2011
Developing a Generic Server/Router Security Solution, 2010

OpenBSD

ACPI resource parsing improvements, autumn 2016
Intel Extreme Tuning driver acpibtu(4), autumn 2016
Flash memory driver conforming to CFI specifications, summer 2015
Octeon-specific driver for the USB Host Controller Interface, summer 2014
Broadcom PHY driver for BCM53115 found on the Octeon DSR-500, spring 2014
Driver implementation for the DS1337 TOD clock for the Octeon platform, winter 2014
USB device drivers clean-up, autumn 2014
Driver implementation for the hardware random number generator on the Octeon platform, autumn 2014
Porting OpenBSD to the Octeon-based D-Link DSR-500, summer 2013
Hibernate support for the Loongson platform, summer 2013 (work in progress)
Statistic clock support for the Loongson platform, winter 2013
CPU scaling support for the Loongson CPU, 2010-2013
Porting the System for the Itanium Platform, 2011 (work in progress)
Futex Implementation, summer 2011
Expanding the Emulation Layer for Linux Binaries, 2010-2011
Suspend/resume support for the Loongson Platform, 2010-2011
Porting Mathematical Applications: Octave, GiNaC, CLN and others, 2009-2010
Driver Implementation for Sony Specific Functionality, acpisony(4), 2010
Generic Kernel Framework for suspend/resume, 2009-2010
Expansion of the Device Autoconfiguration Framework, autumn 2009
Real-mode Emulator Kernel Integration for the Video BIOS, 2009
Driver Implementation for Power Resource Management, acpipwrres(4), summer 2009
Driver Implementation for Video Adjustment, acpivout(4), 2008 - summer 2009
Driver Implementation for Multiple Video Output, acpivideo(4), 2008 - summer 2009
ACPI Framework Development, 2008-2010

BitDefender

64-bit JIT support for the emulator, summer 2010
IEEE 754 Floating Point Support, 2010
Themida Unpacker, 2009
Native Decryption methods for SVKP unpacking, spring 2009

Vmprotect Unpacker, winter 2008-2009
 API Emulation: VB.NET, VBScript, 2008
 tELock Unpacker, summer 2008

Unidec

Project Lead: Implementing a Generic Telephony-server Solution, 2007-2008
 IVR Implementation, 2007
 VoIP Protocol Implementation (IAX2, SIP), 2006
 VoiceMail Solutions Development for NEC America, 2005-2006

Collaborations

MTier, Oil Industry: Native Binary Emulation of Linux Executables on OpenBSD, 2010, 2012
 Bitfusion.io, I.T. Supercomputing Industry: Optimization and scaling of OpenCL workloads, 2015
 Parta, I.T. Security Industry: Driver implementation and application porting for OpenBSD, 2014, 2015

Research Grants

BSD Fund: Futex Implementation for OpenBSD

Academic Research

Publications

Books

1. B. Dumitrescu and **P. Irofti**, *Dictionary Learning Algorithms and Applications*, Springer, 2018

Journal

1. B. Dumitrescu and **P. Irofti**, “Regularized K-SVD,” *IEEE Signal Processing Letters*, vol. 24, no. 3, pp. 309–313, March 2017
2. **P. Irofti**, “Efficient Parallel Implementation for Single Block Orthogonal Dictionary Learning,” *Journal of Control Engineering and Applied Informatics*, vol. 18, no. 3, pp. 101–108, 2016
3. **P. Irofti**, “Efficient Dictionary Learning Implementation on the GPU Using OpenCL,” *U.P.B. Scientific Bulletin, Series C*, vol. 78, no. 3, pp. 39–50, 2016

Conference

1. **P. Irofti** and F. Stoican, “Dictionary Learning Strategies for Sensor Placement and Leakage Isolation in Water Networks,” in *The 20th World Congress of the International Federation of Automatic Control*, 2017, pp. 1589–1594
2. B. Dumitrescu and **P. Irofti**, “Low Dimensional Subspace Finding via Size-Reducing Dictionary Learning,” in *2016 IEEE International Workshop on Machine Learning for Signal Processing (MLSP)*, 2016, pp. 1–6
3. **P. Irofti**, “The Effect of Atom Replacement Strategies on Dictionary Learning,” in *International Traveling Workshop on Interactions Between Sparse Models and Technology*, 2016, pp. 10–11

4. **P. Irofti** and B. Dumitrescu, "Overcomplete Dictionary Learning with Jacobi Atom Updates," in *39th International Conference on Telecommunications and Signal Processing*, 2016, pp. 421–424
5. **P. Irofti** and B. Dumitrescu, "Regularized Algorithms for Dictionary Learning," in *2016 International Conference on Communications (COMM)*, 2016, pp. 439–442
6. **P. Irofti**, "Sparse Denoising with Learned Composite Structured Dictionaries," in *19th International Conference on System Theory, Control and Computing*, 2015, pp. 331–336
7. **P. Irofti** and B. Dumitrescu, "Cospase Dictionary Learning for the Orthogonal Case," in *19th International Conference on System Theory, Control and Computing*, 2015, pp. 343–347
8. **P. Irofti** and B. Dumitrescu, "Overcomplete Dictionary Design: the Impact of the Sparse Representation Algorithm," in *The 20th International Conference on Control Systems and Computer Science*, 2015, pp. 901–908
9. **P. Irofti** and B. Dumitrescu, "GPU Parallel Implementation of the Approximate K-SVD Algorithm Using OpenCL," in *22nd European Signal Processing Conference*, 2014, pp. 271–275

Projects

- "Implementation and development of algorithms for the dynamic motion planning of robotic systems", CEC 2017 project, 2017
- "Set-theoretic approaches for fault tolerant control of complex systems", TE 2015 project, 2015-2017
- "Sparse representations in signal processing", IDEI 2011 project, 2014-2016

Teaching Classes

- "Using Operating Systems",
Bachelor Program "Computer and Information Tehnology",
Faculty of Mathematics and Computer Science
University of Bucharest, 2017-present
- "Operating Systems", Bachelor Program "Informatics",
Faculty of Mathematics and Computer Science
University of Bucharest, 2017-present
- "Computation for Complex Systems", (with Prof. B. Dumitrescu),
Master Program "Complex Systems",
Faculty of Automatic Control and Computer Science
Polytechnic University of Bucharest, 2017-2018
- "Numerical Methods" (Prof. B. Dumitrescu),
Bachelor Program "Automatic Control and Systems Engineering",
Faculty of Automatic Control and Computer Science
Polytechnic University of Bucharest, 2014-2018
- "Parallel and distributed processing of data and knowledge" (with Prof. B. Dumitrescu),
Master Program "Intelligent Systems Control",
Faculty of Automatic Control and Computer Science
Polytechnic University of Bucharest, 2012-2017
- "Modelling and Simulation" (Lecturer. F. Stoican),
Bachelor Program "Automatic Control and Systems Engineering",
Faculty of Automatic Control and Computer Science
Polytechnic University of Bucharest, 2015-2016

Conference and Seminar Presentations

Dictionary Learning Applications in Control Theory (slides)

Recent Advances in Artificial Intelligence, Bucharest, Romania June 19-20, 2017

Making OpenBSD Useful on the Octeon Network Gear (video)

European BSD Conference, Sofia, Bulgaria September 25-28, 2014

Dynamic Analysis: Knowing When to Stop

Dagstuhl Seminar

Challenges in Analysing Executables: Scalability, Self-Modifying Code and Synergy (14241)

Schloss Dagstuhl, Leibniz-Zentrum für Informatik,

Leibniz, Germany, June 9-13, 2014

Porting OpenBSD on the MIPS64-based Octeon Platforms

BSDCan Conference, Ottawa, Ontario, Canada, May 14-17, 2014

Emulator Design, Traps and Pitfalls

Dagstuhl Seminar Analysis of Executables: Benefits and Challenges (12051)

Schloss Dagstuhl, Leibniz-Zentrum für Informatik,

Leibniz, Germany, January 29th - February 3rd, 2012

OpenBSD's New Suspend and Resume Framework (presentation)

European BSD Conference, Maarssen, Utrecht, Netherlands, October 6-9, 2011

Asian BSD Conference, Tokyo, Japan, March 17-20, 2011 (canceled due to natural disasters)

On the Linux Compatibility Layer in OpenBSD 5.0

Slackathon Conference, Stockholm University, Stockholm, Sweden, August 6th, 2011

Image Processing with Wavelet Transformations (in romanian)

Faculty of Automatic Control and Computer Science,

Polytechnic University of Bucharest,

Bucharest, Romania, June, 2008

Conferences and Workshops Attended

Ports Hackathon, Epitech École d'Informatique, Nantes, France, April 23-29, 2018

Ports Hackathon, IN-Berlin, Berlin, Germany November 1-6, 2017

General Hackathon, Computer Laboratory, Cambridge, UK August 30th - September 5th, 2016

Ports Hackathon, Epitech École d'Informatique, Nantes, France, April 25-29, 2016

General Hackathon, SAIT Polytechnic, Calgary, Canada July 15-21, 2015

European General OpenBSD Hackathon, Ljubljana, Slovenia July 8-14, 2014

General Hackathon, University of Toronto, Toronto, Canada May 29th - June 5th, 2013

Network Hackathon, University of Otago, Dunedin, New Zealand January 13-19, 2013

Hardware Hackathon, Coimbra University, Coimbra, Portugal November 14-20, 2012

Network Hackathon, Starnberg, Germany September 17-21, 2012

General OpenBSD Hackathon, Budapest, Hungary July 7-14, 2012

Rthreads Hackathon, Henri Poincaré Institute, Paris, France April 10-14, 2012
Ports Hackathon, Budapest, Hungary November 12-18, 2011
European General OpenBSD Hackathon, Ljubljana, Slovenia September 16-23, 2011
General OpenBSD Hackathon, University of Alberta, Edmonton, Canada July 2-9, 2011
OpenBSD Kernel Hackathon, Hafnarfjordur, Iceland April 1-7, 2011
Ports Hackathon, Budapest, Hungary, October 23-29, 2010
Japan General Hackathon, Akiyama, Sake Mura, Nagano, Japonia September 19-25, 2010
General OpenBSD Hackathon, University of Alberta, Edmonton, Canada June 25th - 3rd July, 2010
Hardware OpenBSD Hackathon, Coimbra University, Coimbra, Portugal November 21-27 2009
Ports Hackathon, Budapest, Hungary October 9-16, 2009
General OpenBSD Hackathon, University of Alberta, Edmonton, Canada, May 30th - June 7th, 2009
Ports Hackathon, Budapest, Hungary October 24-31, 2008

Other Activities

NewOrder Security Site Administrator.

Updated December 17, 2018