

PAOLO RECH

Curriculum Vitae

PERSONAL INFORMATION

Surname / Name	Rech Paolo
Home Address	via Giaretta 3/A, 36065 Mussolente (VI), Italy
Office Address	Instituto de Informatica, UFRGS, Av Bento Gonçalves 9500, Porto Alegre (RS), Brazil Department of Control and Computer Engineering, Politecnico di Torino, Torino, Italy
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Nationality	Italian
Date of birth	30 December 1981

Scopus ID	19638969800
Orcid ID	http://orcid.org/0000-0002-0821-1879

h-index	21 (according to google scholar)
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TEACHING AND RESEARCH

Oct. 2012 - Ongoing

Associate Professor at UFRGS, Porto Alegre, Brazil

Teaching Activity:

Objects Detections for Automotive and Aerospace Applications (Ph.D. course):

- Modern computing architectures for image processing and neural networks (GPUs, FPGAs, Parallel and Heterogeneous devices)
- Approximate computing and power budgets
- Convolutional Neural Networks, features extractions, activation function
- Efficiency and reliability, accuracy, ISO 26262, fault-tolerance techniques

Computer Architecture (undergrads.)

- Binary base representations and operations
- Von Neumann architectures, memory bottleneck
- Assembly, addressing methods, conditions and operations

Computer Organization (undergrads.)

- CISC vs RISC, MIPS and ARM architectures (mono and multicycle)
- Pipeline and caches, Superscalar and VLIW
- Modern architectures (GPUs, FPGAs, Heterogeneous devices)
- Performance metrics (MIPS, GFLOPS, CPI, etc...)

Fault Tolerance (undergrads.)

- Faults generation (radiation, voltage and temperature variations, etc...)
- Probability of faults, errors, failures, critical failures
- Reliability standards for safety-critical and consumer applications
- Software and hardware fault-tolerant techniques
- Fault injection, software vulnerability

Mentoring: *Ph.D. students:* Daniel A. G. Oliveira, Fernando Fernandez, Pablo Bodmann, Gabriel Freytag. *Master students:* Fabiano Libano, Fernando Fernandez, Pablo Bodmann, Thiago C. Santini, Filipe Linz. *Undergrad. Students:* Caio Lunardi, Vinicius Fratin, Lucas Klein, Gabriel Piscoya, Pedro Basso, Rubens Rech.

Research Topics:

- Reliability and efficiency of self-driving vehicles for automotive, aerospace, and military applications
- Efficient fault tolerance techniques for High Performance Computing (HPC) applications and architectures
- Workload distribution in heterogeneous computing systems (CPU-GPU and CPU-FPGA)
- Operating systems and register file criticality for embedded applications

Active Collaborations:

- ARM: prediction and evaluation of future architectures and IPs reliability
- JPL and NASA: autonomous vehicles and HPC for space exploration
- NVIDIA: reliability of GPUs architectures for autonomous vehicles
- NVIDIA and Los Alamos National Laboratory (LANL): reliability for HPC
- LANL, JPL, Arizona State Univ., Brigham Young Univ.: FPGA, microprocessors, and parallel devices reliability
- AMD: Heterogeneous devices efficiency and reliability
- Northeastern University (USA), Politecnico di Torino, Science and Technology Facility Council (STFC, UK): self-driving car reliability

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Research Funding – PI, unless stated otherwise

- €171,473.23 Marie Curie Individual Fellowship, EU, 2020
- \$164,600 Los Alamos National Lab (USA), Rosen fellow grant, 2019
- R\$29,000 CNPq (Brazil), automotive reliability (ranked 6th in the country), 2019
- £30,000 grants to support ARM devices reliability research, STFC (UK), 2018
- R\$290,320 Pronex, FAPERGS (Brazil), collaborator 2017-2019
- £40,000 grants to support self-driving car reliability research, STFC (UK), 2018
- R\$28,000 gift as one of the best researchers of the region, FAPERGS (Brazil), 2018
- R\$200,000 in 4 years, grants for 2 Ph.D. students, CNPq and CAPES, 2014-2018
- R\$130,000 in 3 years, grants for 2 master and 4 undergrads students, 2015-2018
- R\$250,000 “Embedded systems for aerospace”, CNPq, co-PI, 2015-2018
- €33,900 EnergySFE, CAPES-European Commission, collaborator, 2016-2018
- \$40,000 sabbatical leave from Brazilian Foundation for Public Inst. (CAPES), 2017
- \$20,752 “HPC reliability”, Los Alamos Natl. Lab., subcontract, 2017
- \$6,428 “GPU for space application”, Jet Propulsion Lab. (JPL), subcontract, 2017
- €2M+R\$2M, HPC4e, EU Commission (H2020)/CAPES, collaborator, 2015-2017
- R\$28,000 “Reliability of Heterogeneous Architectures”, CNPq, 2014-2017
- ~€250,000 “LoReLAY”, European Commission, collaborator, 2013-2016
- ~R\$18,000 per year, travel grants from CNPq, CAPES, and UFRGS, 2011-ongoing
- ~£70,000 per year, beam time at ChipIR, STFC, UK, 2011 - ongoing
- ~\$80,000 per year, beam time at LANSCE, DOE, USA, 2011 - ongoing

Oct. 2020 – ongoing

Marie Skłodowska Curie Fellow at Politecnico di Torino, Italy

Research Project: pursuing efficient reliability of object detection for automotive and aerospace applications

Mar. 2019 – Dec. 2019

Rosen Scholar Fellow at Los Alamos National Laboratory, USA

Research Project: autonomous vehicles and supercomputers reliability

Sept. 2016 – August 2017

Visiting Professor at Northeastern University, Boston (host: Prof. David Keali)

Research Project: Reliability of parallel devices for HPC and self-driving cars.

Teaching Activity: Digital Circuit Design and Computer Organization (undergrad.)

Feb. 2017 – April 2017

Visiting Professor at LANL, Los Alamos, NM (host: Dr. Nathan DeBardeleben)

Research Project: Efficient hardening strategies for HPC

May 2017 – June 2017

Visiting Professor at JPL, Pasadena, CA (host: Dr. Steven Guertin)

Research Project: GPUs and microprocessors reliability for space applications.

EDUCATION AND TRAINING

Oct. 2011 – Oct. 2012

Post DOC at UFRGS, Porto Alegre, Brazil

Research Topics: Radiation effects on Graphic Processing Units.

Built a test setup for neutron radiation of GPUs, defining the parallel benchmark to run on the Device Under Test. The first documented radiation test on GPUs was performed on December, 2011 by UFRGS team at ISIS, Didcot, UK.

Teaching Activity: Computer Architecture (undergrad.)

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Jan. 2010 – Oct. 2011

Post DOC at LIRMM, University of Montpellier II, France

Research Topics: High altitude radiation effects on SRAMs.

Built a reliable test system to measure the error rate of SRAMs exposed to the natural neutron flux at various latitudes and altitudes.

Jan. 2007 – Apr. 2010

Ph.D. student at University of Padova, Department of Information Engineering
Advisor: Prof. Alessandro Paccagnella

Thesis: Soft Errors Induced by Neutrons and Alpha Particles in System on Chips

Research Topics:

- Test setup reusing Design For Testability with Politecnico di Torino and ST
- Experimentally determine the SoC sensitivity to different impinging particles
- Improve the reliability microprocessors to meet automotive safety standards

Teaching Activity: Assistant in Digital Circuit Design (undergrad.)

Co-mentoring: Sergio Vendramini and Massimo Miotti (undergrad. student)

Grants: Evaluate the impact of Design for Manufacturing Library Optimizations on embedded microprocessors radiation induced error rates in collaboration with *STMicroelectronics*, Agrate, Italy

April 2006

Master Degree in Informatics Engineering at University of Padova, Department of Information Engineering

Degree Thesis:

Design, Realize and Experimental Application of a System for FPGAs Testing under Ions and Neutrons Beams

July 2000

***Diploma di Maturità Scientifica* Degree at Liceo Scientifico Statale “J. Da Ponte”, Bassano del Grappa, Italy**

WORK EXPERIENCE

2008 - 2009

Mathematic and Informatics teacher at *Liceo Scientifico Cavanis* High School, Possagno, Italy

2007 – 2008

Digital Systems Electronics lecturer at University of Padova, Italy

August 2007

Volunteer worker at *Centro Catequético de Anchilo*, Nampula, Mozambique

June 2006

Design and built a radiation tests setup for *STMicroelectronics* test chips

May 2006 – Dec 2007

Research Assistant at University of Padova, Italy

2002 – 2009

Help students to prepare exams and tests

2000 – 2005

Waiter at Trattoria “La Veneziana”, Bassano del Grappa (VI), Italy

1999 – 2009

Debug both software and hardware issues, and restore the pc functionality

July – Sept. 1998 and 2000

Worker at Bifrangi s.p.a., Mussolente(VI), Italy

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AWARDS AND RECOGNITIONS

2020 EU Marie Skłodowska-Curie Fellow for the project PERIOD
2020 Society Impact Award from the Rutherford Appleton Laboratory, UK, for the work evaluating and improving the reliability of AI frameworks for object detection in autonomous vehicles
Italian Scientific Qualification (ASN) as Associate Professor for the Macro Academic Field 09/H1 (computer engineering) and 01/B1 (computer science)
2019 Rosen Scholar Fellow at Los Alamos National Lab for the achievements in the field of supercomputers and autonomous vehicles reliability
2019 EU Marie Skłodowska-Curie Seal of Excellence for the project PERIOD
2020 IEEE Senior Member
Facility Access Panel Member of Science and Technology Facility Council (UK)
2018 Excellence of the town of Mussolente for the career successes
2018 Best professor of the department, from class of 2018, UFRGS INF department
IEEE Dependable and Secure systems and Networks (**DSN 2019**) **best paper runner**
IEEE Dependable and Secure systems and Networks (**DSN 2018**) **best paper runner**
IEEE SELSE **2017 and 2020 best paper award**

PERSONAL SKILLS AND COMPETENCES

Languages

Italian: Mother language
English: Understanding, Speaking, and Writing: Fluent
Portuguese: Understanding, Speaking, and Writing: Fluent
French: Understanding: Fluent, Speaking and Writing: Good

Social skills and competences

Excellent research group leadership acquired advising Ph.D. and M.S. students. Outstanding researches lead and tasks organization. Confident in multidisciplinary discussions. Great experience in performing and organizing irradiation experiments, acquired with more than 30 runs at *Laboratori Nazionali di Legnaro*, INFN, Italy, at *ISIS, Rutherford Appleton Laboratory*, Didcot, UK, at *TSL*, Uppsala, Sweden, and at *LANSCE, Los Alamos National Laboratory*, NM. Excellent interaction with people and excellent skills in collaborating with other institutions (both for doing research and writing grants proposals). Excellent teaching methods, my scores from student are always higher than the department average.

Personal interests

I am a very active and energetic person: I assiduously practice sports like running, tennis, skiing and, mostly, hiking and climbing. From my dad (a tireless and pioneer hiker) I have inherited the passion for mountains: wherever there is a slope, I must hike it. I am also an insatiable reader and art (paintings and music, mostly) lover, a characteristic I have inherited from my mother. I am not unused to stand in front of a painting for a long time to get inspiration.

REVIEWER ACTIVITY

IEEE Transaction on Computers, Jan. 2016 – Ongoing
IEEE Transactions on Reliability, Dec. 2017 - Ongoing
ACM Transactions on Architecture and Code Optimization, Feb. 2017 – Ongoing
IEEE Transactions on Emerging Topics in Computing, Jan. 2017 – Ongoing
IEEE Journal of Supercomputing, Oct. 2014 – Ongoing
IEEE Transaction on Nuclear Science, Oct. 2011 – Ongoing
IEEE Journal of Parallel and Distributed Computing, Sept. 2016 – Ongoing
IEEE Transaction on Multi-Scale Computing Systems, Sept. 2016 – Ongoing

EVENTS ORGANIZING COMMITTEE

IEEE DSN 2019, 2021 Program committee member
IEEE SELSE 2020, 2021, General co-chair
ISC High Performance 2019, 2020 AI Program committee member
IEEE SELSE 2017, 2018, 2019, Program chair
IEEE NSREC 2017 SEE Devices and ICs session chair
IEEE SELSE 2014, 2015, 2016 Publicity co-chair
FASA 2014, General co-chair

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REFERENCES

Dr. Gus Sinnis

Los Alamos Neutron Science Center (LANSCE), Director

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Prof. Luigi Carro

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Fellow, AMD

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Prof. Matteo Sonza Reorda

Head of Ph.D. school, Politecnico di Torino

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Dr. Christopher Frost

Leader in Neutronics and Industrial Development, Rutherford Appleton
Laboratory, Science and Technology Facility Council (STFC), UK

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email: christopher.frost@stfc.ac.uk

Dr. Nathan DeBardleben

LANL, Lead of UltraScale Systems Research Center and Resilience

phone: +1 (505)-412-1069

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Dr. Steven Keckler

Vice President of Architecture Research, NVIDIA

email: skeckler@nvidia.com

Prof. Alessandro Paccagnella (Ph.D. advisor)

Vice-rector for International Relations, University of Padova

phone: +39-049-827.7686

email: paccag@dei.unipd.it

more references will be given upon request

LIST OF PUBLICATIONS

PAOLO RECH*Curriculum Vitae*

- Book F. Kastensmidt and P. Rech, “FPGAs and Parallel Architectures for Aerospace Applications”, Springer 2016
- Report “Inter-Disciplinary Research Challenges in Computer Systems for the 2020s”, US National Science Foundation (NSF) technical report, 2018
- Journals D. Oliveira, S. Blanchard, N. DeBardleben, F. dos Santos, G. Piscocoya, P. Navaux, S. Wender, C. Cazzaniga, C. Frost, R. C. Baumann, P. Rech, “Thermal Neutrons: a Possible Threat for Supercomputer Reliability”, *Journal of Supercomputing*, May 23, 2020
- D. A. G. Oliveira, L. L. Pilla, T. Santini, and P. Rech, “Evaluation and Mitigation of Radiation-Induced Soft Errors in Graphics Processing Units”, *IEEE Transactions on Computers*, vol. 65, no. 3, pp. 791-804, March 1 2016
- F. F. dos Santos, P. F. Pimenta, L. K. Draghetti, C. Lunardi, D. Kaeli, and P. Rech, “Analyzing and Increasing the Reliability of Convolutional Neural Networks on GPUs”, *IEEE Transactions on Reliability*, 2019, Vol. 48, issue 2, pp. 663-677, June 2019
- P. Basso, F. F. Dos Santos, P. Rech, “Impact of Tensor Cores and Mixed-Precision on the Reliability of Matrix Multiplication in GPUs”, *IEEE Transactions on Nuclear Science*, March 2020
- M. Goncalves, I. Lamb, P. Rech, R. Brum, J. Azambuja, “Improving Selective Fault Tolerance in GPU Register Files by Relaxing Application Accuracy”, *IEEE Transactions on Nuclear Science*, March 2020
- D. A. G. Oliveira, F. F. dos Santos, G. Davila, C. Cazzaniga, C. Frost, R. Baumann, P. Rech, “High-Energy Versus Thermal Neutron Contribution to Processor and Memory Error Rates”, *IEEE Transactions on Nuclear Science*, March 2020
- F. Libano, B. Wilson, M. Wirthlin, P. Rech, and J. Brunhaver, “Understanding the Impact of Quantization, Accuracy, and Radiation on the Reliability of Convolutional Neural Networks on FPGAs”, *IEEE Transactions on Nuclear Science*, March 2020
- F. F. dos Santos, L. Carro, and P. Rech, “Kernel and Layer Vulnerability Factor to Evaluate Object Detection Reliability in GPUs”, *IET Computers and Digital Techniques*, vol. 13, no. 3, pp. 178-186, 5 2019
- F. Libano, B. Wilson, J. Anderson, M. J. Wirthlin, C. Cazzaniga, C. Frost, and P. Rech, “Selective Hardening for Neural Networks in FPGAs”, *IEEE Transactions on Nuclear Science*, 2019, Vol. 66, pp. 216-222
- O. Kibar, P. Mohamn, P. Rech, and K. Mai, “Evaluating the Impact of Repetition, Redundancy, Scrubbing, and Partitioning on 28-nm FPGA Reliability Through Neutron Testing”, *IEEE Transactions on Nuclear Science*, 2019, Vol. 66, pp. 248-254
- V. Fratin, D. A. G. Oliveira, P. Navaux, L. Carro, and P. Rech, “Energy-Delay-FIT Product to compare processors and algorithm implementations”, *IEEE Microelectronics Reliability*, 2018, vol. 84, pp. 112-120
- F. Fernandes, L. Weigel, C. Jung, P. Navaux, L. Carro, and P. Rech, “Evaluation of Histogram of Oriented Gradients Soft Errors Criticality for Automotive Applications”, in *ACM Transaction on Architecture and Code Optimization (TACO)*, 2016, Volume 13, Issue 4, pp. 38:1--38:25

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T. Santini, P. Rech, G. Nazar, F. Wagner, “Beyond Cross-Section: Spatio-Temporal Reliability Analysis”, *ACM Transaction on Embedded Computing Systems*, Volume 15 Issue 1, February 2016

F. Libano, P. Rech, L. Tambara, J. Tonfat, and F. Kastensmidt, “On the Reliability of Linear Regression and Pattern Recognition Feedforward Artificial Neural Networks in FPGAs”, *IEEE Transactions on Nuclear Science*, vol. 64, Issue 1, January 2018

L. A. Tambara, F. L. Kastensmidt, P. Rech, F. Lins, N. H. Medina, N. Added, V. A. P. Aguiar, M. A. G. Silveira, “Reliability-Performance Analysis of Hardware and Software Co-Designs in SRAM-based APSocS”, *IEEE Transactions on Nuclear Science*, vol. 65, no. 8, pp. 1935-1942, Aug. 2018

C. Lunardi, H. Quinn, L. Monroe, D. Oliveira, P. O. A. Navaux, P. Rech, “Experimental and Analytical Analysis of Sorting Algorithms Error Criticality for HPC and Large Servers Applications”, *IEEE Transactions on Nuclear Science* Vol. 64, Issue 8, August 2017, Pages 2169-2178

F. Linz, L. Tambara, F. Kastensmidt, and P. Rech, “Register File Criticality and Compiler Optimization Effects on Embedded Microprocessors Reliability”, *IEEE Transactions on Nuclear Science* vol. 64, no. 8, pp. 2179-2187, Aug. 2017

L. Tambara, P. Rech, E. Chielle, J. Tonfat, F. Kastensmidt, “Analyzing the Impact of Radiation-Induced Failures in Programmable SoCs” , in *IEEE Transactions on Nuclear Science*, 2016, Volume 63, Issue 4, pp. 2217 – 2224

L. L. Pilla, D. A. G. Oliveira, C. Lunardi, P. O. A. Navaux, L. Carro, and P. Rech, “Memory Access Time and Input Size Effects on Parallel Processors Reliability”, in *IEEE Transactions on Nuclear Science*, 2016, Volume 66, Issue 6, pp. 2627 – 2634

H. Quinn, W. Robinson, P. Rech, M. Aguirre, A. Barnard, M. Desogus, L. Entrena, M. Garcia-Valderas, S. Guertin, D. Kaeli, F. L. Kastensmidt, B. Kiddie, A. Sanchez-Clemente, M. Sonza Reorda, K. Sterpone, and M. Wirthlin, “Using Benchmarks for Radiation Testing of Microprocessors and FPGAs”, in *IEEE Transactions on Nuclear Science*, 2015, Volume 62, Issue 6, pp. 2547 – 2554

J. Tonfat, F. L. Kastensmidt, P. Rech, R. Reis, and H. Quinn, “Analyzing the Effectiveness of a Frame-level Redundancy Scrubbing Technique for SRAM-based FPGAs”, in *IEEE Transactions on Nuclear Science*, 2015, Volume 62, Issue 6, pp. 3080 - 3087

T. Santini, L. Carro, F. R. Wagner, P. Rech, “Reliability Analysis of Operating Systems and Software Stack for Embedded Systems”, *IEEE Transactions on Nuclear Science*, 2016, Volume 63, Issue 4, pp. 2225 - 2232

D. Oliveira, P. Rech, H.M. Quinn, T.D. Fairbanks, L. Monroe, S.E. Michalak, C. Anderson-Cook, P. Navaux, and L. Carro, “Modern GPUs Radiation Sensitivity Evaluation and Mitigation Through Duplication With Comparison”, *IEEE Transactions on Nuclear Science*, 2014, Volume 61, Issue 6, pp. 3115 – 3122

D. Sabena, M. Sonza Reorda, L. Sterpone, P. Rech, L. Carro, “Evaluating the radiation sensitivity of GPGPU caches: New algorithms and experimental results”, *IEEE Microelectronics and Reliability Journal*, 2014, Volume 54, Issue 11m pp. 2621 – 2628

D. Sabena, L. Sterpone, L. Carro, and P. Rech, “Reliability Evaluation of Embedded GPGPUs for Safety Critical Applications”, *IEEE Transactions on Nuclear Science*, 2014, Volume 61, Issue 6, pp. 3123 – 3130

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- P. Rech, C. Frost, L. Carro, "GPUs neutron sensitivity dependence on data type", *Journal of Electronic Testing: Theory and Applications*, June 2014, Vol. 30, no. 3, pp. 307-316
- P. Rech, G. Nazar, C. Frost, and L. Carro, "GPUs Reliability Dependence on Degree of Parallelism", *IEEE Transaction on Nuclear Science*, April 2014, Vol. 61, no. 4, pp. 1755-1762
- L. Pilla, P. Rech, F. Silvestri, C. Frost, P. Navaux, M. Sonza Reorda, and L. Carro, "Software-Based Hardening Strategies for Neutron Sensitive FFT Algorithms on GPUs", *IEEE Transaction on Nuclear Science*, March 2014, Vol. 61, no. 4, pp. 1874-1880
- P. Rech, T. Fairbanks, H. Quinn, and L. Carro, "Threads Distribution Effects on Graphics Processing Units Neutron Sensitivity", *IEEE Transaction on Nuclear Science*, Dec. 2013, Volume 60, Issue 6, pp. 4220-4225
- P. Rech, C. Aguiar, C. Frost, and L. Carro, "An Efficient and Experimentally Tuned Software-Based Hardening Strategy for Matrix Multiplication on GPUs", *IEEE Transaction on Nuclear Science*, Aug. 2013, Volume 60, Issue 4, pp. 2797-2804
- G. Nazar, P. Rech, C. Frost, and L. Carro, "Radiation and Fault Injection Testing of a Fine-Grained Error Detection Technique for FPGAs", *IEEE Transaction on Nuclear Science*, Aug. 2013, Volume 60, Issue 4, pp. 2742-2749
- J. Azanbujá, G. Nazar, P. Rech, L. Carro, "Evaluating Neutron Induced SEE in SRAM-based FPGA Protected by Hardware- and Software-based Fault Tolerant Techniques", *IEEE Transaction on Nuclear Science*, Aug. 2012, Volume 59, Issue 4
- A. Griffoni, J. van Duivenbode, D. Linten, E. Simoen, P. Rech, L. Dilillo, F. Wrober, P. Verbist, and G. Groeseneken, "Neutron-Induced Failure in Silicon IGBTs, Silicon Super-Junction and SiC MOSFETs", *IEEE Transaction on Nuclear Science*, Aug. 2012, Volume 59, Issue 4, pp. 866-871
- P. Rech, J-M Galliere, P. Girard, G. Alessio, J. Boch, F. Wrobel, F. Saigné, and L. Dilillo, "Neutron-Induced Multiple Bit Upsets on Two Commercial SRAMs under Dynamic-Stress", *IEEE Transaction on Nuclear Science*, Aug. 2012, Volume 59, Issue 4, pp. 893-899
- P. Rech, J-M Galliere, P. Girard, F. Wrobel, F. Saigné, and L. Dilillo, "Impact of Resistive-Open Defects on SRAM Error Rate Induced by Alpha Particles and Neutrons" *IEEE Transaction on Nuclear Science*, June 2011, Volume 58, Issue 3
- F. Wrobel, J-R. Vaillé, D. Pantel, L. Dilillo, P. Rech, J-M. Galliere, A. Touboul, P. Chadoutaud, P. Cocquerez, M. Lacourty, T. Lam-Trong, J-L. Autran, C. Chatry, F. Laplanche, B. Azais, and F. Saigné "Experimental Characterization of Atmospheric Radiation Environment with Stratospheric Balloon" *IEEE Transaction on Nuclear Science*, June 2011, Volume 58, Issue 3, pp. 945-951
- P. Rech, A. Paccagnella, P. Bernardi, M. Grosso, M. Sonza Reorda, F. Melchiori, and D. Appello "Evaluating the Impact of DFM Library Optimizations on Alpha-induced SEU Sensitivity in a Microprocessor Code" *IEEE Transactions on Nuclear Science*, 2010, Volume 57, Issue 4, Part 1, August 2010, pp. 2098 – 2105

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M. Violante, L. Sterpone, A. Manuzzato, S. Gerardin, P. Rech, M. Bagatin, A. Paccagnella, C. Andreani, A. Pietropaolo, G. Cardarilli, S. Pontarelli, C. Frost, "A new hardware/software platform and a new 1/E neutron source for soft error studies: testing FPAGs at the ISIS facility" IEEE Transactions on Nuclear Science, 2007, Volume 54, Issue 4, Part 2, August 2007, pp. 965 – 970

Most recent (2013-2021) and relevant international conferences

F. F. dos Santos, S. Hari, P. Basso, L. Carro, P. Rech, "Unveiling GPU Vulnerabilities: Comparing and Combining Beam, Fault Simulation, and Profiling", to be presented at 35th IEEE International Parallel & Distributed Processing Symposium (IPDPS 2021)

D. Oliveira, S. Blanchard, N. DeBardleben, F. dos Santos, G. Piscocya, P. Navaux, S. Wender, C. Cazzaniga, C. Frost, R. C. Baumann, P. Rech, "Thermal Neutrons: a Possible Threat for Supercomputers and Safety Critical Applications", presented at Silicon Errors in Logic System Effects (SELSE 2020), Stanford, MA – Best Paper winner

A. Chatzidimitriou, P. Bodmann, G. Papadimitriou, D. Gizopoulos, P. Rech, "Demystifying Soft Error Assessment Strategies on ARM CPUs: Microarchitectural Fault Injection vs. Neutron Beam Experiments", at 2019 IEEE/IFIP International Conference on Dependable Systems and Networks (DSN 2019) - Best Paper candidate

F. F. dos Santos, D. Oliveira, C. Lunardi, F. Libano, and P. Rech, "Reliability Evaluation of Mixed-Precision Architectures", 25th International Symposium on High-Performance Computer Architecture (HPCA 2019), Washington DC, USA, 2019

G. P. Dávila, D. Oliveira, P. Navaux and P. Rech, "Identifying the Most Reliable Collaborative Workload Distribution in Heterogeneous Devices", Design, Automation & Test in Europe Conference & Exhibition (DATE 2019), Florence, Italy

F. F. dos Santos, P. Navaux, L. Carro, and P. Rech, "Impact of Reduced Precision in the Reliability of Deep Neural Networks for Object Detection", European Test Symposium (ETS 2019), Baden Baden, Germany

D. A. Gonçalves De Oliveira, P. Navaux, and P. Rech, "Increasing the Efficiency and Efficacy of Selective-Hardening for Parallel Applications", 32nd IEEE International Symposium on Defect and Fault Tolerance in VLSI and Nanotechnology (DFT 2019), ESA-ESTEC, Delft, Netherlands

F. G. Previlon, C. Kalra, D. R. Kaeli, and P. Rech, "A Comprehensive Evaluation of the Effects of Input Data on the Resilience of GPU Applications", 32nd IEEE International Symposium on Defect and Fault Tolerance in VLSI and Nanotechnology (DFT 2019), ESA-ESTEC, Delft, Netherlands

G. P. Dávila, D. Oliveira, P. Navaux, and P. Rech, "Impact of Workload Distribution on Energy Consumption, Performance, and Reliability of Heterogeneous Devices", Parallel, Distributed and Network-based Processing (PDP 2019), Pavia, Italy

V. Fratin, D. A. G. Oliveira, C. Lunardi, F. Santos, G. Rodrigues, and P. Rech, "Code-Dependent and Architecture-Dependent Reliability Behaviors", 2018 IEEE/IFIP International Conference on Dependable Systems and Networks (DSN 2018) - Best Paper candidate

F. G. Previlon, C. Kalra, D. R. Kaeli, and P. Rech, "Evaluating the impact of execution parameters on program vulnerability in GPU applications," 2018 Design, Automation & Test in Europe Conference & Exhibition (DATE), Dresden, 2018, pp. 809-814.

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D. A. G. Oliveira, L. Pilla, N. DeBardeleben, S. Blanchard, H. Quinn, I. Koren, P. O. A. Navaux, and P. Rech, “Experimental and Analytical Study of Xeon Phi Reliability”, International Conference for High Performance Computing, Networking, Storage and Analysis (SC 2017), Denver, CO

D. A. G. Oliveira, F. B. Moreira, P. Rech and P. Navaux, “Predicting the Reliability Behavior of HPC Applications”, 30th International Symposium on Computer Architecture and High Performance Computing (SBAC-PAD 2018)

D. A. G. Oliveira, L. L. Pilla, M. Hanzich, V. F. Neto, C. Lunardi, J. M. Cela, P. O. A. Navaux, L. Carro, and P. Rech, “Radiation-Induced Error Criticality in Modern HPC Parallel Accelerators”, 23rd International Symposium on High- Performance Computer Architecture (HPCA 2017), Austin, TX, USA, 2017

F. Fernandes, L. Weigel, C. Jung, P. Navaux, L. Carro, and P. Rech, “Evaluation of Histogram of Oriented Gradients Soft Errors Criticality for Automotive Applications”, presented at European Network on High Performance and Embedded Architecture and Compilation (HIPEAC 2017), Stockholm, Sweden, 2017

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