Roberto Palmieri

Contact Information	454 Durham Hall Bradley Department of Electrical and Computer Engineering Virginia Tech Blacksburg, VA 24061, USA	*Office Phone:* +1 (540) 231-0642 *Personal Phone:* +1 (540) 676-9018 *Web:* `http://www.ssrg.ece.vt.edu/~palmieri` *Web:* `https://robertopalmieri.github.io/` *E-mail:* robertop@vt.edu; palmieri.rob@gmail.com

Research Interests

Distributed Computing: Theory and Practice, Distributed Systems, Concurrency, Fault-tolerance, Cloud Computing, Operating Systems, Performance Modeling. Concurrent and Transactional Data Structures, Software and Hardware Transactional Memory, Distributed Transactional Memory, State-Machine Replication, Consensus Protocols.

Summary

- **Award winner of the AFOSR's 2017 Young Investigator Program (YIP)**.
- More than 55 papers published in major Parallel and Distributed Computing and Concurrency conferences and journals (e.g., PODC, DISC, PPoPP, SPAA, ICDCS, DSN, Middleware, IPDPS, IEEE TC, IEEE TPDS).
- Advisement of 7 PhD students (5 graduated); 8 MS students (8 graduated); 4 BS students.
- The Hyflow middleware has been used in the recent literature on distributed computing as a framework for building new algorithms for distributed in-memory transactions.
- Total awarded research funding: $357,499 as PI; $920,086 as co-PI (considering the specific project's contribution as detailed later).

Education

- **PhD in Computer Engineering** **March 2012**
  "Sapienza" University of Rome
  Title: "Speculative Protocols for Actively Replicated Transactional Systems"
  Advisor: Prof. Francesco Quaglia
  External Referees: Prof. Jennifer Lundelius Welch, Texas A&M University, USA; and Prof. Rachid Guerraoui, École Polytechnique Fédérale De Lausanne, Switzerland
- **Master Degree in Computer Engineering** **September 2008**
  "Sapienza" University of Rome
  Title: "Modeling and Evaluation of Relational DBMS based on Lock Concurrency Control and Non Uniform Data Access Pattern"
  Advisor: Prof. Bruno Ciciani

Position Professional experience

Research Assistant Professor **July 2014 – present**
Bradley Department of Electrical and Computer Engineering
Virginia Tech
Blacksburg, VA 24061, USA

Past Positions

- **Post-doctoral Research Associate** **January 2013 – July 2014**
  Systems Software Research Group
  Bradley Department of Electrical and Computer Engineering
  Virginia Tech
  Blacksburg, VA 24061, USA
  Supervisor: Prof. Binoy Ravindran
- **Post-doctoral Researcher** **January 2012 – December 2012**
  Department of Computer, Control, and Management Engineering "Antonio Ruberti" (DIAG)
  Sapienza University of Rome
  Supervisor: Prof. Francesco Quaglia
- **Lecturer** **September 2010 – December 2012**
  Faculty of Computer Engineering
  Sapienza University of Rome
  Supervisor: Prof. Bruno Ciciani

Summary of Research Impact

- Many of my results obtained in the area of Distributed Computing and Transactional Memory are regularly cited from papers appearing in major conferences/journals (an average of more than 80 citations per year in the last four years). As an example, the best paper award of ACM/IFIP/USENIX Middleware 2012 contrasts itself against "Osare: Opportunistic speculation in actively replicated transactional systems". In addition, many results have been recently included in the first comprehensive book on in-memory synchronization, titled "Transactional Memory: Foundations, Algorithms, Tools and Applications" (Springer).
- Transitioning of major distributed synchronization protocols designed in the context of the Cloud-TM project (`www.cloudtm.eu`) into Infinispan, Red Hat's open-source data-grid, which is used in a number of production systems and recently integrated into the famous JBoss Middleware.
- Transitioning of programming extensions to include semantics into protocols for managing concurrency of multi-threaded applications into GCC, the famous compiler for C/C++ applications.
- The Hyflow middleware has been used as baseline framework to implement new algorithms and compare against in several works addressing the problem of distributed transactions. Recent examples include "Atomic RMI: A Distributed Transactional Memory Framework" by K. Siek and Pawel T. Wojciechowski published in the International Journal of Parallel Programming, and "Supporting Multiple Data Replication Models in Distributed Transactional Memory" by J. A. Silva, T. M. Vale, R. J. Dias, H. Paulino, and J. M. Lourenço published in the proceedings of the 2015 International Conference on Distributed Computing and Networking.

Sponsored Research

Proposals (as PI)

1. "Programming Extensions To Exploit Semantics In Concurrent Applications", Proposed Award Period: 11/01/2016 – 10/31/2019, Source: AFOSR Young Investigator Research Program (YIP), PI: Dr. Roberto Palmieri, Co-PI: None. Total amount of project: $357,499. Awarded.
2. "CRII: CSR: Developing Efficient Algorithms for Processing Transactions with Enforced Order", Proposed Award Period: 06/01/2017 – 05/31/2019, Source: NSF, PI: Dr. Roberto Palmieri, Co-PI: None. Total amount of project: $173,823. Under Review.
3. "HRC: High Performance Runtime and Compiler Software Framework for Multi-threaded Applications", Proposed Award Period: 11/01/2015 – 10/31/2019, Source: AFOSR, PI: Dr. Roberto Palmieri (contribution: 95%), Co-PI: Dr. Binoy Ravindran (contribution: 5%). Total amount of project: $960,020. Under Review.

Proposals (as Co-PI)

1. "Alvin: A Strongly Consistent and Highly Scalable Geo-Distributed Transactional Software System", Grant Number: FA9550-15-1-0098, Award Period: 03/31/2015 – 09/30/2018, Source: AFOSR, PI: Dr. Binoy Ravindran, Co-PI: Dr. Roberto Palmieri (contribution: 40%). Total amount of project: $920,086. Awarded.
2. "Hands-on, Minds-on Learning in Systems Software: Linux Kernel, Memory Transactions, and Theorem Proving", Awarded Period: 05/15/2016 – 05/14/2019, Source: ONR (STEM), PI: Dr. Binoy Ravindran, Co-PI: Dr. Roberto Palmieri (contribution: 20%), Dr. Antonio Barbalace, Dr. Giuliano Losa. Total amount of project: $1,804,559. Awarded.
3. "DURIP: A Testbed to Investigate Scalable and Power-Efficient Scale-out Systems Software", Awarded Period: 11/01/2015 – 10/31/2016, Source: AFOSR, PI: Dr. Binoy Ravindran, Co-PI: Dr. Roberto Palmieri (contribution: 30%), Dr. Antonio Barbalace. Total amount of project: $200,000.67. Awarded.
4. "DURIP: Enabling High Core-count Shared Memory Scalability Research", Awarded Period: 07/15/2017 – 07/14/2018, Source: AFOSR, PI: Dr. Binoy Ravindran, Co-PI: Dr. Roberto Palmieri (contribution: 15%), Dr. Antonio Barbalace, Dr. Sandeep Hans, Dr. Giuliano Losa, Dr. Sebastiano Peluso. Total amount of project: $449,627. Under Review.

Invited Talks

1. "On the Safety of Lazy Subscription in Hardware Transactional Memory", Workshop organized post OPODIS PC meeting, USI, Lugano, CH, October 22, 2016. Invited speaker.
2. "Transactional Replication: from Cluster to Geographic Scale", CESCA Seminars in Spring 2015, Virginia Tech, April 24, 2015. Invited speaker.
3. "TAE-JS: automated enhancement of JavaScript programs by leveraging the Java annotations infrastructure", *2013 International Conference on Principles and Practices of Programming on the Java Platform: Virtual Machines, Languages, and Tools (PPPJ)*, Authors: Myoungkyu Song, Eli Tilevich, pages 13-24, ACM, September 11-13, 2013, Stuttgart, Germany. Guest presentation.
4. "On Closed Nesting and Checkpointing in Replicated Distributed Transactional Memory", 27th IEEE International Parallel & Distributed Processing Symposium (IPDPS 2013), Authors: Aditya Dhoke, Binoy Ravindran, Bo Zhang, pages 41-52, IEEE, May 20-24, 2013, Boston, MA USA. Guest presentation.
5. "Speculative transactional replication protocols: Overview of AGGRO, STR, and OSARE", *ARISTOS Workshop*, September 5-6, 2012, Lisbon, Portugal.
6. "OSARE: Opportunistic Speculation in Actively REplicated Transactional Systems", *2nd Euro-TM Plenary Meeting Workshop on Transactional Memory (WTM), 7th European Conference on Computer Systems (EuroSys)*, April 10, 2012, Bern, Switzerland.
7. "Boosting STM Replication via Speculation", *1st Euro-TM Workshop on Distributed Transactional Memory (WDTM)*, February 22, 2012, Lisbon, Portugal.
8. "Performance Modelling and Replication of Software Transactional Memories", *1st Plenary Meeting of Euro-TM, Transactional Memories: Foundations, Algorithms, Tools, and Applications*, May 19-20, 2011, Paris, France.

Publications & Relevant Pending Submissions

Book Chapters

1. Roberto Palmieri, Sebastiano Peluso and Binoy Ravindran
   Transaction Execution Models in Partially Replicated Transactional Memory: The Case for Data-flow and Control-flow
   Book title: Transactional Memory: Foundations, Algorithms, Tools and Applications
   Editors: Paolo Romano and Rachid Guerraoui, Springer, 2015
2. Joao Barreto, Pierangelo Di Sanzo, Roberto Palmieri and Paolo Romano
   Cloud-TM: an elastic, self-tuning transactional store for the cloud
   Book title: Data Intensive Storage Services for Cloud Environments
   IGI Global, 2013
3. Junwhan Kim, Roberto Palmieri and Binoy Ravindran
   On Scheduling in Distributed Transactional Memory: Techniques and Tradeoffs
   Book title: Data Centers
   Springer, 2014

Journal Articles

1. Mohamed Mohamedin, Roberto Palmieri, Ahmed Hassan, Binoy Ravindran
   Managing Resource Limitation of Best-Effort HTM
   IEEE Transactions on Parallel and Distributed Systems (IEEE TPDS), Major Revision submitted.
2. Ahmed Hassan, Roberto Palmieri, Sebastiano Peluso, Binoy Ravindran
   Optimistic Transactional Boosting
   IEEE Transactions on Parallel and Distributed Systems (IEEE TPDS), Major Revision to be submitted.

3. Sebastiano Peluso, Roberto Palmieri, Paolo Romano, Binoy Ravindran, Francesco Quaglia
Disjoint-Access Parallelism: Impossibility, Possibility, and Cost of Transactional Memory Implementations
Distributed Computing journal (DC), Springer, Major Revision submitted.

4. Sachin Hirve, Roberto Palmieri, Binoy Ravindran
HiperTM: High Performance, Fault-Tolerant Transactional Memory
Theoretical Computer Science journal (TCS), To Appear, 2016.

5. Ahmed Hassan, Roberto Palmieri, Binoy Ravindran
Remote Transaction Commit: Centralizing Software Transactional Memory Commits
IEEE Transactions on Computers (IEEE TC), Volume 65, Issue 7, Pages 2228–2240, 2016.

6. Alexandru Turcu, Roberto Palmieri, Binoy Ravindran
On Open Nesting in Distributed Transactional Memory
IEEE Transactions on Computers (IEEE TC), Volume 65, Issue 6, Pages 1856–1868, 2016.

7. Alexandru Turcu, Roberto Palmieri, Binoy Ravindran
Automated Data Partitioning for Highly Scalable and Strongly Consistent Transactions
IEEE Transactions on Parallel and Distributed Systems (IEEE TPDS), Volume 27, Issue 1, Pages 106–118, 2016.

8. Pierangelo Di Sanzo, Francesco Quaglia, Bruno Ciciani, Alessandro Pellegrini, Diego Didona, Paolo Romano, Roberto Palmieri, Sebastiano Peluso
A flexible framework for accurate simulation of cloud in-memory data stores
Simulation Modelling Practice and Theory, Volume 58, Pages 219–238, 2015.

9. Paolo Romano, Roberto Palmieri, Francesco Quaglia, Nuno Carvalho and Luis Rodrigues
On Speculative Replication of Transactional Systems
Journal of Computer and System Sciences (JCSS), Volume 80, Issue 1, Pages 257-276, 2014.

10. Pierangelo Di Sanzo, Bruno Ciciani, Francesco Quaglia, Roberto Palmieri and Paolo Romano
On the Analytical Modeling of Concurrency Control Algorithms for Software Transactional Memories: the Case of Commit-Time-Locking
Performance Evaluation Journal (PEVA), Volume 69, Issue 5, Pages 187-205, 2012.

Conference Articles[1]

1. Mohamed Saad, Roberto Palmieri, Sandeep Hans, Binoy Ravindran
"Speeding up Execution of Ordered Memory Transactions"
22st ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming (PPoPP), Under submission.

2. Sandeep Hans, Ahmed Hassan, Roberto Palmieri, Sebastiano Peluso, Binoy Ravindran
"Opacity vs TMS2: Expectations and Reality"
30th International Symposium on Distributed Computing (DISC 2016), EATCS, September 26 - 30, 2016, Paris, France.

3. Mohamed Saad, Roberto Palmieri, Ahmed Hassan and Binoy Ravindran
"Extending TM Primitives using Low Level Semantics"
28th ACM Symposium on Parallelism in Algorithms and Architectures (SPAA 2016), ACM, July 11 - 13, 2016, Asilomar State Beach, California, USA.

4. Duane Niles, Roberto Palmieri and Binoy Ravindran
"Exploiting Parallelism of Distributed Nested Transactions"
9th ACM International Systems and Storage Conference (SYSTOR 2016), ACM, June 6-8, 2016, Haifa, Israel. Number of submissions: 53. Acceptance rate: 28%.

5. Sebastiano Peluso, Alexandru Turcu, Roberto Palmieri, Giuliano Losa and Binoy Ravindran
"Making Fast Consensus Generally Faster"
46th Annual IEEE/IFIP International Conference on Dependable Systems and Networks (DSN

[1]Author presenting the paper is underlined. Number of submissions and acceptance rate are provided if available.

2016), IEEE, June 28 - July 1, 2016, Toulouse, France. Number of submissions: 259. Acceptance rate: 20%.

6. Mohamed Mohamedin, Roberto Palmieri, Sebastiano Peluso and Binoy Ravindran
"On Designing NUMA-Aware Concurrency Control for Scalable Transactional Memory"
21st ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming (PPoPP), Short Paper, ACM, March 12-16, 2016, Barcelona, Spain. Number of submissions: 151. Acceptance rate: 19%.

7. Mohamed Saad, Roberto Palmieri and Binoy Ravindran
"On Ordering Transaction Commit"
21st ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming (PPoPP), Short Paper, ACM, March 12-16, 2016, Barcelona, Spain. Number of submissions: 151. Acceptance rate: 19%.

8. Ahmed Hassan, Roberto Palmieri and Binoy Ravindran
"Transactional Interference-less Balanced Tree"
29th International Symposium on Distributed Computing (DISC), LNCS Springer, October 5-9, 2015, Tokyo, Japan.

9. Sebastiano Peluso, Roberto Palmieri, Paolo Romano, Binoy Ravindran and Francesco Quaglia
"Disjoint-Access Parallelism: Impossibility, Possibility, and Cost of Transactional Memory Implementations"
34th Annual ACM Symposium on Principles of Distributed Computing (PODC), ACM, July 21-23, 2015, Donostia-San Sebastian, Spain. Number of submissions: 191. Acceptance rate: 23%.

10. Mohamed Mohamedin, Roberto Palmieri and Binoy Ravindran
"Tolerating CPU Transient Faults in Multicore Architectures"
35th International Conference on Distributed Computing Systems (ICDCS), Short Paper, IEEE, June 29 - July 2, 2015, Columbus, Ohio, USA.

11. Alexandru Turcu, Sebastiano Peluso, Roberto Palmieri and Binoy Ravindran
"Making Fast Consensus Generally Faster"
35th International Conference on Distributed Computing Systems (ICDCS), Short Paper, IEEE, June 29 - July 2, 2015, Columbus, Ohio, USA.

12. Mohamed Mohamedin, Roberto Palmieri, Ahmed Hassan and Binoy Ravindran
"Brief Announcement: Managing Resource Limitation of Best-Effort HTM"
27th ACM Symposium on Parallelism in Algorithms and Architectures (SPAA), ACM, June 13-15 2015, Portland, Oregon, USA. Number of submissions: 130. Acceptance rate full papers: 24.61%.

13. Mohamed Mohamedin, Roberto Palmieri and Binoy Ravindran
"Brief Announcement: On Scheduling Best-Effort HTM Transactions"
27th ACM Symposium on Parallelism in Algorithms and Architectures (SPAA), ACM, June 13-15 2015, Portland, Oregon, USA. Number of submissions: 130. Acceptance rate full papers: 24.61%.

14. Aditya Dhoke, Roberto Palmieri and Binoy Ravindran
"An Automated Framework for Decomposing Memory Transactions to Exploit Partial Rollback"
29th IEEE International Symposium on Parallel and Distributed Processing (IPDPS), IEEE, May 26-28, 2015, Hyderabad, India. Number of submissions: 496. Acceptance rate: 21.8%.

15. Aditya Dhoke, Roberto Palmieri and Binoy Ravindran
"On Reducing False Conflicts in Distributed Transactional Data Structures"
16th International Conference on Distributed Computing and Networking (ICDCN), ACM, January 4-7, 2015, Goa, India.

16. Bo Zhang, Binoy Ravindran and Roberto Palmieri
"Reducing Aborts in Distributed Transactional Systems through Dependency Detection" *16th International Conference on Distributed Computing and Networking (ICDCN)*, ACM, January 4-7, 2015, Goa, India.

17. Ahmed Hassan, Roberto Palmieri and Binoy Ravindran "On Developing Optimistic Transactional Lazy Set"
18th International Conference on Principles of Distributed Systems (OPODIS), Springer LNCS, December 15-19, 2014, Cortina, Italy. Number of submissions: 98. Acceptance rate: 32.65%.

18. Alexandru Turcu, Sebastiano Peluso, Roberto Palmieri and Binoy Ravindran
"Be General and Don't Give Up Consistency in Geo-Replicated Transactional Systems"
18th International Conference on Principles of Distributed Systems (OPODIS), Springer LNCS, December 15-19, 2014, Cortina, Italy. Number of submissions: 98. Acceptance rate: 32.65%.

19. Sachin Hirve, Roberto Palmieri, Binoy Ravindran
"Archie: A Speculative Replicated Transactional System"
ACM/IFIP/USENIX 15th International Middleware Conference (MIDDLEWARE), December 8-12, 2014, Bordeaux, France. Number of submission: 144. Acceptance Rate: 18.75%.

20. Sebastiano Peluso, Roberto Palmieri, Paolo Romano, Binoy Ravindran and Francesco Quaglia, Binoy Ravindran
"Brief Announcement: On Breaching the Wall of Impossibility Results on Disjoint-Access Parallel STM"
28th International Symposium on Distributed Computing (DISC), Springer LNCS, October 12-15, 2014, Austin, Texas, USA.

21. Mohamed Mohamedin, Binoy Ravindran, Roberto Palmieri
"On Making Transactional Applications Resilient to Data Corruption Faults"
13th IEEE International Symposium on Network Computing and Applications (NCA), IEEE, August 21-23, 2014, Boston, USA. Acceptance Rate: 24%.

22. Bo Zhang, Binoy Ravindran and Roberto Palmieri
"Distributed Transactional Contention Management as the Traveling Salesman Problem"
The 21th International Colloquium on Structural Information and Communication Complexity (SIROCCO), Springer LNCS, July 23-25, 2014, Hida Takayama, Japan.

23. Alexandru Turcu, Roberto Palmieri and Binoy Ravindran
"Automated Data Partitioning for Highly Scalable and Strongly Consistent Transactions"
7th ACM International Systems and Storage Conference (SYSTOR), ACM, June 10-12, 2014, Haifa, Israel. Acceptance rate: 50%.

24. Ahmed Hassan, Roberto Palmieri and Binoy Ravindran
"Remote Invalidation: Optimizing the Critical Path of Memory Transactions"
28th IEEE International Symposium on Parallel and Distributed Processing (IPDPS), IEEE, May 19-23, 2014, Phoenix, Arizona, USA. Number of submission: 541, Acceptance rate: 21.1%.

25. Ahmed Hassan, Roberto Palmieri and Binoy Ravindran
"Optimistic Transactional Boosting"
ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming (PPoPP), Poster paper, ACM, February 15-19, 2014, Orlando, Florida, USA. Acceptance Rate: 15.6%.

26. Sachin Hirve, Roberto Palmieri, Binoy Ravindran
"HiperTM: High Performance, Fault-Tolerant Transactional Memory"
15th International Conference on Distributed Computing and Networking (ICDCN), Springer LNCS, January 4-7, 2014, Coimbatore, India. Acceptance Rate: 29%.

27. Alexandru Turcu, Roberto Palmieri, Binoy Ravindran
"Automated Data Partitioning for Independent Distributed Transactions"
ACM/IFIP/USENIX 14th International Middleware Conference (Middleware), Proceedings of the Posters and Demo Track, ACM, December 9-13, 2013, Beijing, China.

28. Sachin Hirve, Roberto Palmieri, Binoy Ravindran
"SMASH: speculative state machine replication in transactional systems"
ACM/IFIP/USENIX 14th International Middleware Conference (Middleware), Proceedings of the Posters and Demo Track, ACM, December 9-13, 2013, Beijing, China.

29. Aditya Dhoke, Roberto Palmieri, Binoy Ravindran
"On high performance distributed transactional data structures"
ACM/IFIP/USENIX 14th International Middleware Conference (Middleware), Proceedings of the Posters and Demo Track, ACM, December 9-13, 2013, Beijing, China.

30. Sachin Hirve, Aaron Lindsay, Binoy Ravindran and Roberto Palmieri
"On Transactional Memory Concurrency Control in Distributed Real-Time Programs"
IEEE Cluster 2013, September 23-27, 2013, Indianapolis, IN, USA. Number of submissions: 147, Acceptance rate: 31%.

31. Alexandru Turcu, Binoy Ravindran, Roberto Palmieri
"Hyflow2: A High Performance Distributed Transactional Memory Framework in Scala"
2013 International Conference on Principles and Practices of Programming on the Java Platform: Virtual Machines, Languages, and Tools (PPPJ), ACM, September 11-13, 2013, Stuttgart, Germany. Number of submissions: 47, Acceptance rate: 25.53%.

32. Sebastiano Peluso, Roberto Palmieri, Francesco Quaglia, Binoy Ravindran
"On the Viability of Speculative Transactional Replication in Database Systems: a Case Study with PostgreSQL"
12th IEEE International Symposium on Network Computing and Applications (NCA), IEEE, August 22-24, 2013, Cambridge, MA USA. Number of submissions: 77, Acceptance rate: 25%.

33. Sudhanshu Mishra, Alexandru Turcu, Roberto Palmieri, Binoy Ravindran
"HyflowCPP: A Distributed Transactional Memory Framework for C++"
12th IEEE International Symposium on Network Computing and Applications (NCA), IEEE, August 22-24, 2013, Cambridge, MA USA. Number of submissions: 77, Acceptance rate: 25%.

34. Alexandru Turcu, Roberto Palmieri, Binoy Ravindran
"Checkpointing and Closed Nesting in DTM"
Poster at 6th International Systems and Storage Conference (SYSTOR 2013), June 30-July 2, 2013, Haifa, Israel.

35. Junwhan Kim, Roberto Palmieri, Binoy Ravindran
"Enhancing Concurrency in Distributed Transactional Memory through Commutativity"
19th International European Conference on Parallel and Distributed Computing (Euro-Par 2013), pages 150-161, LNCS 8097, Springer, August 26-30, 2013, Aachen, Germany. Number of submissions: 261, Acceptance rate: 26.8%.

36. Mohamed Mohamedin, Binoy Ravindran, Roberto Palmieri
"ByteSTM: Virtual Machine-level Java Software Transactional Memory"
15th International Conference on Coordination Models and Languages (COORDINATION 2013), pages 166-180, LNCS 7890, Springer, June 3-5, 2013, Firenze, Italy.

37. Junwhan Kim, Roberto Palmieri, Binoy Ravindran
"Scheduling Open-Nested Transactions in Distributed Transactional Memory"
15th International Conference on Coordination Models and Languages (COORDINATION 2013), pages 105-120, LNCS 7890, Springer, June 3-5, 2013, Firenze, Italy.

38. Roberto Palmieri, Francesco Quaglia and Paolo Romano
"ASAP: an Aggressive SpeculAtive Protocol for Actively Replicated Transactional Systems"
11th IEEE International Symposium on Network Computing and Applications (NCA), pages 203-211, IEEE, August 23-25, 2012, Cambridge, MA USA. Number of submissions: 80, Acceptance rate: 28%.

39. Roberto Palmieri, Paolo Romano, Francesco Quaglia
"OSARE: Opportunistic Speculation in Actively REplicated Transactional Systems"

30th IEEE Symposium on Reliable Distributed Systems (SRDS), pages 59-64, IEEE, October 4-7, 2011, Madrid, Spain. Number of submissions: 88, Acceptance rate: 34%.

40. Pierangelo Di Sanzo, Bruno Ciciani, Francesco Quaglia, Roberto Palmieri and Paolo Romano "Analytical Modeling of Commit-Time-Locking Algorithms for Software Transactional Memories"
35th International Computer Measurement Group Conference (CMG), Computer Measurement Group, December 6-10, 2010, Orlando, FL USA.
41. Paolo Romano, Roberto Palmieri, Francesco Quaglia, Nuno Carvalho and Luis Rodrigues "An Optimal Speculative Transactional Replication Protocol"
8th IEEE International Symposium on Parallel and Distributed Processing with Applications (ISPA), pages 449-457, IEEE, September 6-9, 2010, Taipei, Taiwan.
42. Roberto Palmieri, Paolo Romano, Francesco Quaglia "AGGRO: Boosting STM Replication via Aggressively Optimistic Transaction Processing"
9th IEEE International Symposium on Network Computing and Applications (NCA), pages 20-27, IEEE, July 15-17, 2010, Cambridge, MA USA. Number of submissions: 72, Acceptance rate: 27%.
43. Paolo Romano, Roberto Palmieri, Francesco Quaglia, Nuno Carvalho, Luis Rodrigues "Brief announcement: on speculative replication of transactional systems"
22nd ACM Symposium on Parallelism in Algorithms and Architectures (SPAA), pages 69-71, ACM, June 13-15, 2010, Thira, Santorini, Greece. Number of submissions: 110, Acceptance rate: 31%.
44. Pierangelo Di Sanzo, Roberto Palmieri, Bruno Ciciani, Francesco Quaglia and Paolo Romano "Analytical Modeling of Lock-based Concurrency Control with Arbitrary Transaction Data Access Patterns"
First Joint International Conference on Performance Engineering (WOSP/SIPEW), pages 69-78, ACM, January 28-30, 2010, San Jose, CA USA. Number of submissions: 67, Acceptance rate: 24%.

Workshop Articles[2]

1. Mohamed Saad, Roberto Palmieri and Binoy Ravindran "Lerna: Transparent and Effective Speculative Loop Parallelization"
11th ACM SIGPLAN Workshop on Transactional Computing, ACM, March 12-16, 2016, Barcelona, Spain.
2. Mohamed Saad, Roberto Palmieri, Ahmed Hassan and Binoy Ravindran "On Extending TM Primitives using Low Level Semantics"
11th ACM SIGPLAN Workshop on Transactional Computing, ACM, March 12-16, 2016, Barcelona, Spain.
3. Ahmed Hassan, Sebastiano Peluso, Roberto Palmieri and Binoy Ravindran "On the Correctness of Optimistic Composable Data Structures"
7th Workshop on the Theory of Transactional Memory (WTTM), July 20, 2015, Donostia-San Sebastian, Spain.
4. Ahmed Hassan, Roberto Palmieri and Binoy Ravindran "Transactional Interference-less Balanced Tree"
10th ACM SIGPLAN Workshop on Transactional Computing (TRANSACT), June 15-16, 2015, Portland, Oregon, USA.
5. Balaji Arun, Sachin Hirve, Roberto Palmieri, Sebastiano Peluso and Binoy Ravindran "Speculative Client Execution in Deferred Update Replication"
9th Middleware for Next Generation Internet Computing (MW4NG), workshop of the 15th

[2]Author who presented the paper is underlined.

International Middleware Conference (Middleware 2014), ACM/IFIP/USENIX, December 8-12, 2014, Bordeaux, France.

6. Mohamed Mohamedin, Roberto Palmieri and Binoy Ravindran
"Managing Soft-errors in Transactional Systems"
19th IEEE Workshop on Dependable Parallel, Distributed and Network-Centric Systems (DPDNS), IEEE, May 23, 2014, Phoenix, Arizona, USA.
7. Sebastiano Peluso, Roberto Palmieri, Paolo Romano, Binoy Ravindran and Francesco Quaglia and Binoy Ravindran
"On Breaching the Wall of Impossibility Results on Disjoint-Access Parallel STM"
4th Euro-TM Workshop on Transactional Memory (WTM), Online archive, April 13, 2014, Amsterdam, Netherlands.
8. Ahmed Hassan, Roberto Palmieri and Binoy Ravindran
"Integrating Transactionally Boosted Data Structures with STM Frameworks: A Case Study on Set"
9th Workshop on Transactional Computing (TRANSACT), Online archive, March 2, 2014, Utah, USA.
9. Peng Lu, Antonio Barbalace, Roberto Palmieri, and Binoy Ravindran
"Adaptive Live Migration to Improve Load Balancing in Virtual Machine Environment"
First international FedICI'2013 workshop: Federative and interoperable cloud infrastructures (FedICI 2013), 19th International European Conference on Parallel and Distributed Computing (Euro-Par 2013), August 26, 2013, Aachen, Germany.
10. Bruno Ciciani, Diego Didona, Pierangelo Di Sanzo, Roberto Palmieri, Sebastiano Peluso, Francesco Quaglia and Paolo Romano
"Automated Workload Characterization in Cloud-based Transactional Data Grids"
17th IEEE Workshop on Dependable Parallel, Distributed and Network-Centric Systems (DPDNS12), 26th IEEE International Parallel & Distributed Processing Symposium (IPDPS 2013), pages 1525-1533, IPDPS Workshops, IEEE, May 21-25, 2012, Shanghai, China.
11. Roberto Palmieri, Pierangelo Di Sanzo, Francesco Quaglia, Paolo Romano, S. Peluso and D. Didona
"Integrated Monitoring of Infrastructures and Applications in Cloud Environments"
Workshop On Cloud Computing: Projects And Initiatives (CCPI), 17th International European Conference on Parallel and Distributed Computing (Euro-Par 2011), pages 45-53, Springer, August 30, 2011, Bordeaux, France.
12. Roberto Palmieri, Francesco Quaglia, Paolo Romano and Nuno Carvalho
"Evaluating database-oriented replication schemes in Software Transactional Memory systems"
15th IEEE Workshop on Dependable Parallel, Distributed and Network-Centric Systems (DPDNS10), 26th IEEE International Parallel & Distributed Processing Symposium (IPDPS 2010), pages 1-8, IPDPS Workshops, IEEE, April 19-23, 2010, Atlanta, GA USA.

Student Advisement (not official advisor)

- Current PhD students (2 students)
  - Balaji, PhD Topic: "Improving performance of distributed synchronization algorithms by exploiting fast RDMA technology". Advisor: Prof. Binoy Ravindran. ECE Department, Virginia Tech, USA.
    Type of Advisement: Developing techniques for designing distributed transactional protocols using the recent RDMI technology.
  - Masoomeh Javidi Kishi, PhD Topic: "Designing advanced snapshot isolation algorithms relying on standard lock-based concurrency controls with weak consistency guarantees. Advisor: Prof. Binoy Ravindran. ECE Department, Virginia Tech, USA.
    Type of Advisement: Developing techniques for designing certification layers to be deployed on top of lock-based concurrency controls for DBMS with weak isolation guarantees.

- Past PhD students (5 students)

  – Mohamed M. Saad, PhD May 2016, PhD Dissertation: "Extracting Parallelism from Legacy Sequential Code Using Transactional Memory", Advisor: Prof. Binoy Ravindran. ECE Department, Virginia Tech, USA.
  Type of Advisement: Developing techniques for extracting parallelism from sequential, legacy applications using transactions as building block.
  Employment: Assistant Professor, Alexandria University, Egypt.

  – Ahmed Hassan, PhD September 2015, PhD Dissertation: "Designing, Modeling, and Optimizing Transactional Data Structures". Advisor: Prof. Binoy Ravindran. ECE Department, Virginia Tech, USA.
  Type of Advisement: Participating in the definition of building blocks for providing high performance transactional lazy collections of objects and STM/HTM integration.
  Employment: Postdoctoral Research, Virginia Tech, USA.

  – Mohamed Mohamedin, PhD July 2015, PhD Dissertation: "On Optimizing Transactional Memory: Transaction Splitting, Scheduling, Fine-grained Fallback, and NUMA Optimization,". Advisor: Prof. Binoy Ravindran. ECE Department, Virginia Tech, USA.
  Type of Advisement: Designing and developing TM solutions optimized for multicore architectures.
  Employment: Assistant Professor, Alexandria University, Egypt.

  – Alexandru Turcu, PhD January 2015, PhD Dissertation: "On Improving Distributed Transactional Memory through Nesting, Partitioning and Ordering". Advisor: Prof. Binoy Ravindran. ECE Department, Virginia Tech, USA.
  Type of Advisement: Taking part in the decision of research tasks in the context of geo-replicated transactional systems.
  Employment: Google, NY, USA.

  – Junwhan Kim, PhD 2013, PhD Dissertation: "Scheduling Memory Transactions in Distributed Systems," Dissertation Defended September 3, 2013. Advisor: Prof. Binoy Ravindran. ECE Department, Virginia Tech, USA.
  Type of Advisement: Providing research insights in the design of distributed transactional schedulers for flat and nested transactions;
  Employment: University of District of Columbia, Washington DC, USA.

- Past MS students (8 students)

  – Utkarsh Pandey, MS August 2016, Master's Thesis, "Optimizing Distributed Transactions: Speculative Client Execution, Certified Serializability, and High Performance Run-Time". Advisor: Prof. Binoy Ravindran. ECE Department, Virginia Tech, USA.
  Type of Advisement: Supporting the student in designing and developing speculative solutions to improve performance of transactional systems.

  – Sean R. Moore, MS September 2015, Master's Thesis, "Mutex Locking versus Hardware Transactional Memory: An Experimental Evaluation". Advisor: Prof. Binoy Ravindran. ECE Department, Virginia Tech, USA.
  Type of Advisement: Definition of the research problem and solutions to apply HTM to existing parallel applications by eliding locks.

  – Duane Niles, MS June 2015, Master's Thesis, "Improving Performance of Highly-Programmable Concurrent Applications by Leveraging Parallel Nesting and Weaker Isolation Levels". Advisor: Prof. Binoy Ravindran. ECE Department, Virginia Tech, USA.
  Type of Advisement: Designing protocols for supporting the parallel activation of closed-nested transactions in distributed transactional systems, and improving performance of lock-based concurrency control into in-memory databases.
  Employment: Bloomberg, NY, USA.

- Sree Ram Mohanan, MEng September 2013. Advisor: Prof. Binoy Ravindran. ECE Department, Virginia Tech, USA
  Type of Advisement: Advising in the implementation of an hybrid model between control-flow and data-flow in partially replicated transactional memory.
- Aditya Dhoke, MS 2013, Master's Thesis, "On Partial Aborts and Reducing Validation Costs in Fault-Tolerant Distributed Transactional Memory", Defended September 4, 2013. Advisor: Prof. Binoy Ravindran. ECE Department, Virginia Tech, USA
  Type of Advisement: Advising in the automation of closed-nested techniques for distributed transactional systems;
  Employment: Juniper Networks, Inc., Sunnyvale, CA, USA.
- Fabio Mariotti, MS 2013, Master's Thesis, "A Deployment Infrastructure for Managing QoS Requirements in Cloud Computing environments", Defended January, 2013. Advisor: Prof. Francesco Quaglia. Department of Computer, Control, and Management Engineering "Antonio Ruberti" (DIAG), Sapienza University of Rome, Italy.
  Type of Advisement: Designing goals, tasks and milestones. Designing the entire software infrastructure and deployment processes for managing service level agreement.
  Employment: Developer/Analyst at Neperia.
- Gabriele Ricciardi, MS 2010, Master's Thesis, "Implementation of Mechanisms for Speculation in Transactional Systems", Defended January 22, 2010. Advisor: Prof. Francesco Quaglia. Department of Computer, Control, and Management Engineering "Antonio Ruberti" (DIAG), Sapienza University of Rome, Italy.
  Type of Advisement: Understanding PosgreSQL architectures and internals. Designing goals, and use-cases for evaluating the new features.
  Employment: Software Engineer at Thales Nederland.
- Alessio Manzo, MS 2010, Master's Thesis, "Speculative Replication in Transactional Systems", Defended January 21, 2010. Advisor: Prof. Francesco Quaglia. Department of Computer, Control, and Management Engineering "Antonio Ruberti" (DIAG), Sapienza University of Rome, Italy.
  Type of Advisement: Designing innovative features that rely on speculative processing, for improving performance of PosgreSQL.
  Employment: Software Engineer at Exprivia S.p.A.

- Past BS students (4 students)

  - Kristopher Jung, NAVSEA/Naval Engineering Education Center (NEEC) student, Fall 2015, Conducting Research on HTM transactions. Advisor: Prof. Binoy Ravindran
    Type of Advisement: Exposing the student to the initial challenges of conducting research; developing a simple concurrency control for solving HTM infrastructural limitations.
  - Kevin McGee, Naval Engineering Education Consortium (NEEC) student, Fall 2014, Conducting Research on Scheduling HTM transactions. Advisor: Prof. Binoy Ravindran
    Type of Advisement: Exposing the student to the initial challenges of conducting research; developing a simple scheduling algorithm for HTM transactions.
  - Balaji Arun, BS 2015, Bachelor's Thesis, "Speculative Client Execution in Deferred Update Replication". Advisor: Prof. Binoy Ravindran. ECE Department, Virginia Tech, USA.
    Type of Advisement: Designing protocols for supporting the speculative client execution in replicated transactional systems.
    Employment: PhD student at ECE Department, Virginia Tech.
  - Lisa Vitolo, BS 2012, Bachelor's Thesis, "Supports for Active Replication and Speculation in Software Transactional Memory", Defended September 14, 2012. Advisor: Prof. Francesco Quaglia. Department of Computer, Control, and Management Engineering "Antonio Ruberti" (DIAG), Sapienza University of Rome, Italy.
    Type of Advisement: Designing the overall architecture and implementing core components of the concurrency control.
    Employment: Software Engineer at Google in Dublin.

Teaching Experience

- Spring 2016. ECE 3574 Applied Software Design (Virginia Tech).
- Fall 2011. Lecturer of *Computer Architecture* ("Sapienza" University of Rome).
- Spring 2011. Teaching Assistant of *Operating System* ("Sapienza" University of Rome).
- Fall 2010. Teaching Assistant of *Computer Architecture* ("Sapienza" University of Rome).
- Spring 2010. Teaching Assistant of *Operating System* ("Sapienza" University of Rome).
- Fall 2009. Teaching Assistant of *Computer Architecture* ("Sapienza" University of Rome).
- Spring 2009. Teaching Assistant of *Programming Techniques* ("Sapienza" University of Rome).
- Fall 2008. Teaching Assistant of *Computer Architecture II* ("Sapienza" University of Rome).
- Fall 2007. Teaching Assistant of *Computer Architecture II* ("Sapienza" University of Rome).
- Fall 2006. Teaching Assistant of *Computer Architecture II* ("Sapienza" University of Rome).

Reviewing Activities and Technical Program Committees

- Journals:
  1. IEEE Transaction on Computers (IEEE TC);
  2. IEEE Transaction on Parallel and Distributed Systems (IEEE TPDS);
  3. IEEE Transactions on Services Computing (IEEE TSC);
  4. Foundations of Computing and Decision Sciences (FCDS);
  5. Computer Languages, Systems and Structures (COMLAN);
- International Conferences:
  6. ACM SIGPLAN Workshop on Transactional Computing (TRANSACT 2017) (PC member);
  7. International Conference on Principles of Distributed Systems (OPODIS 2016) (PC member);
  8. IEEE International Symposium on Network Computing and Applications (IEEE NCA16) (PC member);
  9. IEEE Workshop on Dependable Parallel, Distributed and Network-Centric Systems (DPDNS 2016) (PC Chair);
  10. ACM SIGPLAN Workshop on Transactional Computing (TRANSACT 2016) (PC member);
  11. IEEE International Symposium on Network Computing and Applications (IEEE NCA15) (PC member);
  12. ACM Symposium on Principles of Distributed Computing (PODC 2015) (sub-reviewer);
  13. International Symposium on Distributed Computing (DISC 2015) (sub-reviewer);
  14. ACM SIGPLAN Workshop on Transactional Computing (TRANSACT 2015) (sub-reviewer);
  15. ACM/IFIP/USENIX Middleware (Middleware 2015) (sub-reviewer);
  16. IEEE International Parallel & Distributed Processing Symposium (IPDPS 2015) (sub-reviewer);
  17. International Conference on Principles of Distributed Systems (OPODIS 2014) (sub-reviewer);
  18. International Symposium on Distributed Computing (DISC 2014) (sub-reviewer);
  19. ACM International Systems and Storage Conference (Systor 2014) (sub-reviewer);
  20. International Conference on Parallel Processing (Euro-Par 2014) (sub-reviewer);
  21. IEEE International Symposium on Network Computing and Applications (NCA 2014);
  22. IEEE International Conference on Services Computing (SCC 2013);
  23. IEEE International Conference on Cloud Computing Technology and Science (CloudCom 2013);
  24. International Conference on Dependability (DEPEND 2013);
  25. IEEE Conference on Open Systems (ICOS 2013);
  26. IEEE Conference on Wireless Sensors (ICWiSe 2013);
  27. IEEE Symposium on Network Cloud Computing and Applications (NCCA 2012);
  28. International European Conference on Parallel and Distributed Computing (Euro-Par 2011).

Participation in Research Projects

1. *"HydraVM"*
   Type: Research project founded by AFOSR grant
   Start Date: 2014
2. *"HyFlowTM"*
   Type: Research project founded by AFOSR and NSF grants
   Start Date: 2011
3. *"Cloud-TM"*
   Type: FP7 Strep
   Start Date: June 2010
   Ending Date: June 2013
   Partners: INESC-ID (coordinator), CINI (IT), Algorithmica S.r.l (IT), Red Hat Limited (IE)
4. *"ARISTOS"*
   Type: FCT - All Scientific Domains 2009
   Start date: Feb 2010
   End date: Feb 2013
   Participants: Inesc-ID (PT), Sapienza Rome University (Italy)
5. *"Transactional Memories: Foundations, Algorithms, Tools, and Applications (Euro-TM)"*
   Type: Cost Action
   Start Date: Fall 2010
   Ending Date: Fall 2014
   Prospective Partners: 42 institutions, 12 Countries

Software Systems

1. "Hyflow". It is a container of systems' and libraries' implementations. Specifically:
   - "Distributed Transactional Memory". This system provides support to execute application-level distributed transactions transparently. It can be linked to any C++, Java, and Scala application that requires accessing remote objects, atomically.
   - "State Machine Replication". This system ensures fault tolerance of transactional applications by implementing the State Machine Replication paradigm. Implemented in Java.
   - "Transactional collections". This is a set of user-level libraries that provide implementations of the most used efficient data structure implementations, boosted with the Optimistic Transaction Boosting methodology to be transactional.
   - "Compiler extensions to support low-level semantics". This system is released as a new version of the famous GCC compiler that instruments and executes programmer-defined atomic blocks by exploiting program semantics.
2. "Integrated Monitoring Infrastructures for Cloud Environments". This system is responsible for collecting and integrating information from components deployed in a cloud platform. Sampled data are subsequently used as a support for elastic decisions.
   Web site: `http://www.cloudtm.eu`.
   Technology: JAVA, Lattice broadcast network layer.
3. "Workload Analyzer". This system is integrated in RHQ (Red Hat), the well-known, open-source, framework for visualizing information from modules deployed in a grid/cloud infrastructure. RHQ has been used as a base platform for understanding the behavior for different Infinispan instances running concurrently on different nodes.
   Web site: `http://www.cloudtm.eu`.
   Technology: JAVA, RHQ, Infinispan.
4. "Speculative Simulation". This system is a framework for simulating replicated transactional systems. It implements supports for speculative and out-of-order execution of transactions. It has been often used in recent scientific publications.
   Technology: JAVA, JAVASIM.

References

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