Yair Amir

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Education

Ph.D. Computer Science, The Hebrew University of Jerusalem, Israel, August 1995.
Advisor: Professor Danny Dolev.

M.Sc. Computer Science, The Technion – Israel Institute of Technology, October 1990.
Advisor: Dr. Zvi Rosberg.

B.Sc. Information Systems Engineering, Computer Science, The Technion – Israel Institute of Technology, June 1985, *Summa Cum Laude*.

Academic Appointments

Professor Emeritus, Johns Hopkins University, February 2023 – Present

Professor, Johns Hopkins University, July 2004 – January 2023

Chair, Department of Computer Science, Johns Hopkins, June 2015 – June 2018

Associate Professor, Johns Hopkins University, July 2000 – June 2004

Assistant Professor, Johns Hopkins University, September 1995 – June 2000

Director, Distributed Systems and Networks (DSN) lab, September 1995 – February 2025 (jhu-dsn.github.io/).

Inventing high performance, resilient and secure distributed systems that make a difference, collecting friends along the way.

Research impact:

> Broadly stated, my first decade was spent inventing the concepts, algorithms, and open-source tools (e.g., www.spread.org) that enabled thousands of companies to deploy scalable internet services. As the Internet evolved from enterprise computing to cloud computing, my next decade was spent inventing the overlay concepts enabling next-generation internet services, such as those that help transform the infrastructure of the media industry today through a global service provider (www.ltnglobal.com). My last decade, perhaps the most important from a societal perspective, is spent inventing the concepts and protocols to make the US power grid resilient to intrusions. This third transformation is still work in progress, with some success realized these days transitioning our real-time Byzantine resilient control system for the substation (jhu-dsn.github.io/spire/) to the power industry (GE and Siemens) and to relevant national labs (Pacific Northwest National Laboratory and Sandia National Laboratories).

Research interests:

- *Systems*: Resilient systems, critical infrastructure, clouds, distributed systems, dependability
- *Networks*: Overlay networks, intrusion tolerant networks, low-latency reliability, multicast
- *Algorithms*: Distributed algorithms, intrusion tolerance, fault tolerance, replication

Teaching

Professor in the Department of Computer Science, Johns Hopkins University.

Recipient of the Alumni Association Excellence in Teaching award, the highest teaching award in the Whiting School of Engineering, 2014.
Finalist for the Excellence in Mentoring and Advising award, 2014.
Finalist for the Excellence in Teaching award, 2013.

- Distributed Systems, Fall 95, 96, 97, 98, 99, 00, 02, 03, 04, 06, Spring 08, Fall 09, 10, 12, 14, 16, 19, 21. Graduate and undergraduate course with 15-60 students.
- Advanced Distributed Systems and Networks, Spring 96, 97, 98, 99, 00, 01, 03, 04, 05, 07 Fall 08, Spring 11, 13, 15, 17, 20, 22. Research course with 3-15 students.
- Intermediate Programming, Fall 05, Spring 06, Fall 07, 11, Spring 12, Fall 2013, Spring 2014, Fall 2015, Fall 2017, Fall 2020. Undergraduate course, 30-90 students.
- Software for Resilient Communities, Spring 2018, Spring 2021. Undergraduate course, 15-19 students.
- Selected Topics in Systems Research, Spring 16. Seminar with 11 students.
- Operating Systems, Fall 99, 00. Graduate and undergraduate course with 30-40 students.

Instructor and Teaching Assistant in the Institute of Computer Science, The Hebrew University of Jerusalem, Israel:

- Instructor of the Operating Systems course, Fall 93, 94, Teaching Assistant Fall 91, 92.
- Teaching Assistant of the Distributed Algorithms course, Fall 93, 94.

Publications

Released Software

Unlike published papers, useful software is a live creation that continuously evolves. Some of the innovative software packages below continue to break new grounds. Enhanced releases include: in 2025 – S-13 (Spire), S-11 (Prime) and S-8 (Spines); in 2018 – S-3 (Spread).

S-13 The Spire intrusion tolerant SCADA for the power grid. Y. Amir, T. Aron, A. Babay, T. Tantillo, S. Bommareddy and M. Khan. (jhu-dsn.github.io/spire/). First released on May 2017, most recent release on **March 2025**. An intrusion-tolerant open-source SCADA system with performance guarantees under attack. Successfully withstood a red-team attack conducted by Sandia National Laboratories at Pacific Northwest National Laboratory from March 27 to April 7, 2017. Successfully test-deployed at Hawaiian Electric Company power plant from January 22 to February 1, 2018. Successfully withstood red-team attack conducted by Sandia at PNNL in 2022. Transitioned to GE and to Siemens in 2022-2023. Related papers: C-47, C-46, C-43, C-42, C-39, C-38, I-6, P-12, P-13.

S-12 The Paxos-SB state machine replication engine. Y. Amir and J. Kirsch. (jhu-dsn.github.io/). First released on August 2012. A replication engine based on the Paxos protocol and our Paxos for System Builders full specification of it. Related papers: I-3, TR-5.

S-11 The Prime intrusion tolerant replication system. Y. Amir, B. Coan, J. Kirsch, J. Lane, M. Platania, A. Babay and T. Tantillo. (jhu-dsn.github.io/). First released on June 2010, most recent release on **March 2025**. An intrusion-tolerant replication engine. The first Byzantine replication to provide performance guarantees while under attack. Incorporated by Siemens into a commercial SCADA for the power grid, part of the Spire system. Related papers: J-14, J-12, C-38, C-34, C-32, C-29.

S-10 The STEWARD scalable intrusion tolerant replication system. Y. Amir, C. Danilov, D. Dolev, J. Kirsch, J. Lane, C. Nita-Rotaru, J. Olsen and D. Zage. (jhu-dsn.github.io/). First released on February 2010. An experimental intrusion-tolerant replication engine. The first to provide efficient Byzantine replication over large-scale wide-area networks. Related papers: J-10, C-27, C-25.

S-9 The SMesh seamless wireless mesh network. Y. Amir, C. Danilov, R. Musaloiu-Elefteri and N. Rivera. (jhu-dsn.github.io/). First released on January 2006, most recent release on **May 2008**. A completely transparent mesh system that offers seamless, fast handoff, supporting VoIP and other real-time application traffic for any unmodified 802.11 device. Internet and peer-to-peer communication take advantage of a multi-home routing algorithm that makes effective use of available wired and wireless connectivity. Related papers: J-11, C-31, C-28, C-26, C-24.

S-8 The Spines overlay network platform. Y. Amir, C. Danilov, J. Schultz, D. Obenshain, T. Tantillo and A. Babay. (www.spines.org). First released on February 2003, most recent release on **March 2025**. A framework to construct and deploy innovative networks. Spines allows experimentation and deployment of overlay networks on the Internet to achieve additional services not available in the current infrastructure, as well as to improved performance for existing services. The 2015 version includes the first practical intrusion tolerant network service. A derivative of the 2009 version supports a global scale commercial service. Part of the Spire system. Spines had over 700 distinct downloads from DSN until 2009. Related papers: J-15, J-9, C-38, C-37, C-36, C-33, C-24, C-23, C-21, I-5, I-4, I-2.

S-7 JMS4Spread – A Robust Java Messaging Service (JMS) Without a Single Point of Failure. Y. Amir and A. Munjal. (www.spread.org/JMS4Spread). First released on November 2002. Based on the Spread Toolkit, JMS4Spread had over 700 downloads from DSN until 2009 and was used by Boeing in a government-related project.

S-6 Wackamole – N-way Fail-over Infrastructure for Clusters and Routers. Y. Amir, R. Caudy, A. Munjal and T. Schlossnagle. (jhu-dsn.github.io/). First released on August 2001. Wackamole ensures continued operation of clusters and routers by managing a set of virtual IP addresses, ensuring their exactly-once availability to the outside world at all times. It powers some popular web sites and had over 2700 distinct downloads from DSN until 2007. Related papers: C-20.

S-5 Secure Spread – A High Performance Secure Group Communication System. Y. Amir, Y. Kim, C. Nita-Rotaru, J. Schultz, J. Stanton and G. Tsudik. (jhu-dsn.github.io/). First released on January 2001. An experimental system based on the Spread Toolkit and on robust key agreement protocols. One of 12 technologies selected by DARPA to appear on a DVD summarizing the accomplishments of 6 DARPA programs. Went through a DARPA red-team effort. Selected to JWID 2004. Secure Spread had over 1100 distinct downloads from DSN until 2009. Related papers: J-7, J-6, J-5, C-19, C-17, C-14, C-12.

S-4 Backhand – A Load Balancing Module for the Apache Web Server. Y. Amir and T. Schlossnagle. (jhu-dsn.github.io/). First released on July 1999. A standard package in several Linux distributions and available for Solaris and other operating systems. Invited presentations in several Apache Conferences (apachecon.com). Used by about 10,000 domains on the Internet by April 2001. It had over 7800 distinct downloads from DSN until 2007. Related papers: J-4, J-3, C-10, C-9.

S-3 Spread – A Wide and Local Area Message Bus and Group Communication Toolkit. Y. Amir, M. Miskin-Amir, J. Stanton and J. Schultz. (www.spread.org). First released on October 1997, most recent release **May 2018**. Spread encapsulates a new paradigm for building high performance, highly available distributed systems. Spread is believed to have thousands of installations in commercial and research environments, and is used in teaching by several universities around the world. It is used by several popular open source applications as well as operating under the hood of several commercial products. Spread's mailing list includes about 500 developers and users from around the world. It had over 27,000 distinct downloads from DSN until 2009. Related papers: J-8, J-7, C-35, C-16, C-15, C-13, TR-4, TR-2.

S-2 Totem – one of the main developers of the Totem single-ring group communication system under Professors P. M. Melliar-Smith and L. Moser, and with D. Agrawal and P. Ciarfella at the University of California, Santa Barbara. Part of my PhD research. Related papers: Th-2, J-1, C-4, C-3.

S-1 Transis – one of the initiators and main developers of the Transis group communication system under Professor Danny Dolev and with S. Kramer and D. Malki at the Hebrew University of Jerusalem. Transis was the first group communication system to handle network partitions and merges. Part of my PhD research (1991-1995). Related papers: Th-2, C-7, C-6, C-2, C-1, I-1, TR-1.

Journals

J-16 On Choosing Server- or Client-Side Solutions for BFT. M. Platania, D. Obenshain, T. Tantillo, Y. Amir and N. Suri. The *ACM Computing Surveys (CSUR)*, 48(4), pages 61:1-61:30, May 2016.

J-15 Increasing Network Resiliency by Optimally Assigning Diverse Variants to Routing Nodes. A. Newell, D. Obenshain, T. Tantillo, C. Nita-Rotaru and Y. Amir. The *IEEE Transactions on Dependable and Secure Computing (TDSC)*, 12(6), pages 602-614, November 2015. Related paper: C-33.

J-14 Survivable SCADA via Intrusion-Tolerant Replication. J. Kirsch, S. Goose, Y. Amir, D. Wei and P. Skare. The *IEEE Transactions on Smart Grid*, 5(1), pages 60-70, January 2014. Related paper: C-32.

J-13 Authenticated Adversarial Routing. Y. Amir, P. Bunn and R. Ostrovsky. The *Journal of Cryptology (JoC)*, 27(4), pages 636-771, October 2014. Related paper: C-30.

J-12 Prime: Byzantine Replication Under Attack. Y. Amir, B. Coan, J. Kirsch and J. Lane. The *IEEE Transactions on Dependable and Secure Computing (TDSC)*, 8(4), pages 564-577, July 2011. Related paper: C-29.

J-11 The SMesh Wireless Mesh Network. Y. Amir, C. Danilov, R. Musaloiu-Elefteri and N. Rivera. The *ACM Transactions On Computer Systems (TOCS)*, 28(3), pages 6:1-6:49, September 2010. Related paper: C-26, C-24.

J-10 STEWARD: Scaling Byzantine Fault-Tolerant Replication to Wide Area Networks. Y. Amir, C. Danilov, D. Dolev, J. Kirsch, J. Lane, C. Nita-Rotaru, J. Olsen and D. Zage. The *IEEE Transactions on Dependable and Secure Computing (TDSC)*. 7(1), pages 80-93, January 2010. Related paper: C-25.

J-9 An Overlay Architecture for High Quality VoIP Streams. Y. Amir, C. Danilov, S. Goose, D. Hedqvist and A. Terzis. The *IEEE Transactions on Multimedia (TOM)*, 8(6), pages 1250-1262, December 2006. Related paper: C-23.

J-8 A Cost-Benefit Flow Control for Application Level Multicast and Unicast in Overlay Networks. Y. Amir, B. Awerbuch, C. Danilov and J. Stanton. The *ACM/IEEE Transactions on Networking (TON)*, 13(5), pages 1094-1106, October 2005. Related paper: C-16.

J-7 Secure Spread: An Integrated Architecture for Secure Group Communication. Y. Amir, C. Nita-Rotaru, J. Stanton and G. Tsudik. The *IEEE Transactions on Dependable and Secure Computing (TDSC)*, 2(3), pages 248-261, September 2005. Related paper: C-19.

J-6 On the Performance of Group Key Agreement Protocols. Y. Amir, Y. Kim, C. Nita-Rotaru and G. Tsudik. The *ACM Transactions on Information and Systems Security (TISSEC)*, 7(3), pages 1-32, August 2004. Related papers: C-17, C-12.

J-5 Secure Group Communication Using Robust Contributory Key Agreement. Y. Amir, Y. Kim, C. Nita-Rotaru, J. Schultz, J. Stanton and G. Tsudik. The *IEEE Transactions on Parallel and Distributed Systems (TPDS)*, 15(5), pages 468-480, May 2004. Related paper: C-14.

J-4 An Opportunity Cost Approach for Job Assignment and Reassignment. Y. Amir, B. Awerbuch, A. Barak, R. S. Borgstrom and A. Keren. The *IEEE Transactions on Parallel and Distributed Systems (TPDS)*, 11(7), pages 760-768, July 2000. Related paper: C-10.

J-3 A Cost-Benefit Framework for Online Management of Metacomputing Systems. Y. Amir, B. Awerbuch and R. S. Borgstrom. *The International Journal for Decision Support Systems*, Elsevier Science, 28(1-2), pages 155-164, April 2000. Related paper: C-9.

J-2 Optimal Availability Quorum Systems: Theory and Practice. Y. Amir and A. Wool. *Information Processing Letters*, 65, pages 223-228, April 1998.

J-1 The Totem Single-Ring Ordering and Membership Protocol. Y. Amir, L. E. Moser, P. M. Melliar-Smith, D. A. Agarwal and P. Ciarfella. The *ACM Transactions On Computer Systems (TOCS)*, 13(4), pages 311-342, November 1995. Related paper: C-3.

Refereed Conferences and Workshops

C-47 Tolerating Compound Threats in Critical Infrastructure Control Systems. S. Bommareddy*, M. Khan*, H. Nadeem*, B. Gibly, I. Chiu, J. W. van de Lindt, O. Nofal, M. Panteli, L. W. Wells II, Y. Amir and A. Babay. In *Proceedings of the International Symposium on Reliable Distributed Systems (SRDS24)*, Charlotte NC, September 2024. **Best paper**.

C-46 ByzSec – A Multi-layered Byzantine Resilient Architecture for Bulk Power System Protective Relays. C. Bonebrake, D. J. Sebastian-Cardenas, C. H. Miller, S. Bommareddy, Y. Amir, K. Cornelison, C. Eyre, P. Skare, S N. Gourisetti, A. Ashok and B. Johnson. In *Proceedings of the IEEE Power & Energy Society General Meeting (PESGM)*, Seattle WA, July 2024.

C-45 Optimal Planning Framework for Mitigating Cyber-Induced Cascading Failures in Power Grids. B. V. Venkatasubramanian, S. Hashemi, L. Wells II, K. Blackmond Laskey, J. W. van de Lindt, Y. Amir, A. Babay, I. Chiu, and M. Panteli. In *Proceedings of the IEEE Power & Energy Society General Meeting (PESGM)*, Seattle WA, July 2024.

C-44 A Resilience Assessment Framework for Coupled Power and Communication Infrastructure. M. Lotfi, M. Panteli, L. Wells II, K. Blackmond Laskey, J.W. van de Lindt, Y. Amir, A. Babay and I. Chiu. In *Proceedings of the IEEE Power & Energy Society General Meeting (PESGM)*, pages 1-5, Orlando FL, July 2023.

C-43 Real-Time Byzantine Power Grid Infrastructure: Evaluation and Trade-offs. S. Bommareddy, M. Khan, D. Sebastian Cardenas, C. Miller, C. Bonebrake, Y. Amir and A. Babay. In *the International Workshop on Eplainability of Real-time Systems and their Analysis at the IEEE Real-Time Systems Symposium (RTSS22)*, Houston TX, December 2022.

C-42 Real-Time Byzantine Resilience for Power Grid Substations. S. Bommareddy, D. Qian, C. Bonebrake, P. Skare and Y.Amir. In *Proceedings of the International Symposium on Reliable Distributed Systems (SRDS22)*, pages 135-144, Vienna, Austria, September 2022.

C-41 Data-Centric Analysis of Compound Threats to Critical Infrastructure Control Systems. S. Bommareddy, B. Gilby, M. Khan, I. Chiu, M. Panteli, J. van de Lindt, Y.Amir and A. Babay. In *Proceedings of the IEEE/IFIP International Conference on Dependable Systems and Networks Workshops (DSN22-W)*, pages 72-79, Baltimore MD, June 2022.

C-40 RADICS: Runtime Assurance of Distributed Intelligent Control Systems. B. Wheatman, J. Chen, T. Sookoor and Y. Amir. In *Proceedings of the IEEE/IFIP DSN Workshop on Dependable and Secure Machine Learning (DSML)*, pages 182-187, Taipei, Taiwan (covid-19 virtual), June 2021.

C-39 Deploying Intrusion-Tolerant SCADA for the Power Grid. A. Babay, J. Schultz, T. Tantillo, S. Beckley, E. Jordan, K. Ruddell, K. Jordan and Y. Amir. In *Proceedings of the IEEE/IFIP International Conference on Dependable Systems and Networks (DSN019)*, pages 328-335, Portland OR, June 2019.

C-38 Network-Attack-Resilient Intrusion-Tolerant SCADA for the Power Grid. A. Babay*, T. Tantillo*, T. Aron, M. Platania and Y. Amir. In *Proceedings of the IEEE/IFIP International Conference on Dependable Systems and Networks (DSN018)*, pages 255-266, Luxembourg, June 2018.

C-37 Timely, Reliable, and Cost-Effective Internet Transport Service using Dissemination Graphs. A. Babay, E. Wagner, M. Dinitz and Y. Amir. In *Proceedings of the IEEE International Conference on Distributed Computing Systems (ICDCS17)*, pages 1-12, Atlanta GA, June 2017. **Best Paper**.

C-36 Practical Intrusion-Tolerant Networks. D. Obenshain*, T. Tantillo*, A. Babay, J. Schultz, A. Newell, E. Hoque, Y. Amir and C. Nita-Rotaru. In *Proceedings of the IEEE International Conference on Distributed Computing Systems (ICDCS16)*, pages 45-56, Nara, Japan, June 2016.

C-35 Fast Total Ordering for Modern Data Centers. A. Babay and Y. Amir. In *Proceedings of the IEEE International Conference on Distributed Computing Systems (ICDCS16)*, pages 669-679, Nara, Japan, June 2016.

C-34 Towards a Practical Survivable Intrusion Tolerant Replication System. M. Platania, D. Obenshain, T. Tantillo, R. Sharma and Y. Amir. In *Proceedings of the IEEE International Symposium on Reliable Distributed Systems (SRDS14)*, pages 242-252, Nara, Japan, October 2014. **Nominated for Best Paper**.

C-33 Increasing Network Resiliency by Optimally Assigning Diverse Variants to Routing Nodes. A. Newell, D. Obenshain, T. Tantillo, C. Nita-Rotaru and Y. Amir. In *Proceedings of the IEEE/IFIP International Conference on Dependable Systems and Networks (DSN013)*, pages 1-12, Budapest, Hungary, June 2013.

C-32 Toward Survivable SCADA. J. Kirsch, S. Goose, Y. Amir and P. Skare. In *Proceedings of Annual Cyber Security and Information Intelligence Research Workshop (CSIIRW11)*, Oak Ridge TN, October 2011.

C-31 A Robust Push-to-Talk Service for Wireless Mesh Networks. Y. Amir, R. Musaloiu-Elefteri and N. Rivera. In *Proceedings of the IEEE Conference on Sensor, Mesh and Ad-hoc Communications and Networks (SECON10)*, pages 270-278, Boston MA, June 2010.

C-30 Authenticated Adversarial Routing. Y. Amir, P. Bunn and R. Ostrovsky. In *Proceedings of the IACR Theory of Cryptography Conference (TCC09)*, pages 163-182, San Francisco CA, March 2009.

C-29 Byzantine Replication Under Attack. Y. Amir, B. Coan, J. Kirsch and J. Lane. In *Proceedings of the International Conference on Dependable Systems and Networks (DSN08)*, pages 197-206, Anchorage AK, June 2008.

C-28 On Redundant Multipath Operating System Support for Wireless Mesh Networks. Y. Amir, C. Danilov, M. Kaplan, R. Musaloiu-Elefteri and N. Rivera. In *Proceedings of the IEEE Workshop on Wireless Mesh Networks (WiMesh08)*, San Francisco CA, June 2008.

C-27 Customizable Fault Tolerance for Wide Area Replication. Y. Amir, B. Coan, J. Kirsch and J. Lane. In *Proceedings of the IEEE International Symposium on Reliable Distributed Systems (SRDS07)*, pages 66-80, Beijing, China, October 2007.

C-26 An Inter-domain Routing Protocol for Multi-homed Wireless Mesh Networks. Y. Amir, C. Danilov, R. Musaloiu-Elefteri and N. Rivera. In *Proceedings of the IEEE International Symposium on a World of Wireless, Mobile and Multimedia Networks (WoWMoM07)*, Helsinki, Finland, June 2007.

C-25 Scaling Byzantine Fault-Tolerant Replication to Wide Area Networks. Y. Amir, C. Danilov, D. Dolev, J. Kirsch, J. Lane, C. Nita-Rotaru, J. Olsen and D. Zage. In *Proceedings of the IEEE/IFIP International Conference on Dependable Systems and Networks (DSN06)*, pages 105-114, Philadelphia PA, June 2006. **Award Paper**.

C-24 Fast Handoff for Seamless Wireless Mesh Networks. Y. Amir, C. Danilov, M. Hilsdale, R. Musaloiu-Elefteri and N. Rivera. In *Proceedings of the International Conference on Mobile Systems, Applications, and Services (MobiSys06)*, pages 83-95, Uppsala, Sweden, June 2006.

C-23 1-800-OVERLAYS: Using Overlay Networks to Improve VoIP Quality. Y. Amir, C. Danilov, S. Goose, D. Hedqvist and A. Terzis. In *Proceedings of the International Workshop on Network and Operating Systems Support for Digital Audio and Video (NOSSDAV 2005)*, pages 51-56, Stevenson WA, June 2005.

C-22 Coping with the Insider Threat in Scalable Distributed Information Systems. Y. Amir and C. Nita-Rotaru. In *International Workshop on Future Directions in Distributed Systems(FuDiCo2004)*, Bertinoro, Italy, June 2004.

C-21 Reliable Communication in Overlay Networks. Y. Amir and C. Danilov. In *Proceedings of the International Conference on Dependable Systems and Networks (DSN03)*, pages 511-520, San Francisco CA, June 2003.

C-20 N-Way Fail-Over Infrastructure for Reliable Servers and Routers. Y. Amir, R. Caudy, A. Munjal, T. Schlossnagle and C. Tutu. In *Proceedings of the International Conference on Dependable Systems and Networks (DSN03)*, pages 403-412, San Francisco CA, June 2003.

C-19 Scaling Secure Group Communication: Beyond Peer-to-Peer. Y. Amir, C. Nita-Rotaru, J. Stanton and G. Tsudik. In *Proceedings of DISCEX III*, pages 226-237, Washington DC, April 2003.

C-18 From Total Order to Database Replication. Y. Amir and C. Tutu. In *Proceedings of IEEE International Conference on Distributed Computing Systems (ICDCS02)*, pages 494-503, Vienna, Austria, July 2002.

C-17 On the Performance of Group Key Agreement Protocols. Y. Amir, Y. Kim, C. Nita-Rotaru and G. Tsudik. In *Proceedings of IEEE International Conference on Distributed Computing Systems (ICDCS02)*, short paper, pages 463-464, Vienna, Austria, July 2002.

C-16 Global Flow Control for Wide Area Overlay Networks: A Cost-Benefit Approach. Y. Amir, B. Awerbuch, C. Danilov and J. Stanton. In *Proceedings of IEEE Conference on Open Architectures and Network Programming (OpenArch02)*, pages 155-166, New York, NY, June 2002.

C-15 Framework for Authentication and Access Control of Client-Server Group Communication Systems. Y. Amir, C. Nita-Rotaru and J. Stanton. In *Third International Workshop on Networked Group Communications (NGC01)*, LNCS 2233, pages 120-128, London, November 2001.

C-14 Exploring Robustness in Group Key Agreement. Y. Amir, Y. Kim, C. Nita-Rotaru, J. Schultz, J. Stanton and G. Tsudik. In *Proceedings* of *IEEE International Conference on Distributed Computing Systems (ICDCS01)*, pages 399-408, Phoenix, Arizona, April 2001. **Nominated for best paper**.

C-13 A Low Latency, Loss Tolerant Architecture and Protocol for Wide Area Group Communication. Y. Amir, C. Danilov and J. Stanton. In *Proceedings of the International Conference on Dependable Systems and Networks (DSN00) formerly FTCS*, pages 327-336, New York, New York, June 2000.

C-12 Secure Group Communication with Asynchronous Networks with Failures: Integration and Experiments. Y. Amir, G. Ateniese, D. Hasse, Y. Kim, C. Nita-Rotaru, T. Schlossnagle, J. Schultz, J. Stanton and G. Tsudik .In *Proceedings of the 20th IEEE International Conference on Distributed Computing Systems (ICDCS00)*, pages 330-343, Taipei, Taiwan, April 2000.

C-11 Walrus – a Low Latency, High Throughput Web Service Using Internet-wide Replication. Y. Amir and D. Shaw. In *Proceedings of the 19th IEEE ICDCS Workshop on Electronic Commerce and Web-Based Applications*, pages 31-40, Austin, Texas, May 1999.

C-10 An Opportunity Cost Approach for Job Assignment and Reassignment in a Scalable Computing Cluster. Y. Amir, B. Awerbuch, A. Barak, R. S. Borgstrom and A. Keren. In *Proceedings of the 10th International Conference on Parallel and Distributed Computing and Systems (PDCS'98)*, pages 639-645, Las Vegas, October 1998

C-9 A Cost-Benefit Framework for Online Management of Metacomputing Systems. Yair Amir, Baruch Awerbuch and R. Sean Borgstrom. *The 1st International Conference on Information and Computing Economies (ICE-98)*, pages 140-147, Charleston, October 1998.

C-8 Seamlessly Selecting the Best Copy from Internet-Wide Replicated Web Servers. Y. Amir, A. Peterson and D. Shaw. In *Proceedings of the 12th International Symposium on Distributed Computing (DISC98, formerly WDAG)*, LNCS 1499, pages 22-33 Andros, Greece, September 1998.

C-7 Efficient State Transfer in Partitionable Environments. Y. Amir, G. V. Chockler, D. Dolev and R. Vitenberg. *The European Research Seminar on Advances in Distributed Systems* (ERSADS97), pages 183-191, Valais, Switzerland, March 1997.

C-6 Group Communication as an Infrastructure for Distributed System Management. Y. Amir, D. Breitgand, G. V. Chockler and D. Dolev. In *Proceedings of the International Workshop on Services in Distributed and Networked Environment (SDNE96)*, pages 84-91, July 1996.

C-5 Evaluating Quorum Systems Over the Internet. Y. Amir and A. Wool. In *Proceedings of the Annual International Symposium on Fault-Tolerant Computing Systems (FTCS96)*, pages 26-35, June 1996.

C-4 Extended Virtual Synchrony. L. E. Moser, Y. Amir, P. M. Melliar-Smith and D. A. Agarwal. In *Proceedings of the 14th IEEE International Conference on Distributed Computing Systems (ICDCS94)*, pages 56-65, Poznan, Poland, June 1994.

C-3 Fast Message Ordering and Membership Using a Logical Token-passing Ring. Y. Amir, L. E. Moser, P. M. Melliar-Smith, D. A. Agarwal and P. Ciarfella. In *Proceedings of the 13th IEEE International Conference on Distributed Computing Systems (ICDCS93)*, pages 551-560, Pittsburgh, May 1993.

C-2 Membership Algorithms for Multicast Communication Groups. Y. Amir, D. Dolev, S. Kramer and D. Malki. In *Proceedings of the 6th International Workshop on Distributed Algorithms (WDAG92)*, LNCS 647, pages 292-312, Jerusalem, November 1992.

C-1 Transis: A Communication Sub-System for High Availability. Y. Amir, D. Dolev, S. Kramer and D. Malki. In *Proceedings of the 22nd Annual International Symposium on Fault-Tolerant Computing Systems (FTCS92)*, pages 76-84, Boston, July 1992.

Invited Papers

I-6 Toward an Intrusion-Tolerant Power Grid: Challenges and Opportunities". A. Babay, J. Schultz, T. Tantillo and Y. Amir. Invited to *IEEE International Conference on Distributed Computing Systems (ICDCS18)*, pages 1321-1326, Vision track, Vienna, Austria, July 2018.

I-5 Structured Overlay Networks for a New Generation of Internet Services. A. Babay, C. Danilov, J. Lane, M. Miskin-Amir, D. Obenshain, J. Schultz, J. Stanton, T. Tantillo and Y. Amir. Invited to *IEEE International Conference on Distributed Computing Systems (ICDCS17)*, pages 1771-1779, Vision track, Atlanta GA, June 2017.

I-4 Intrusion-Tolerant Cloud Monitoring and Control. D. Obenshain, T. Tantillo, A. Newell, C. Nita-Rotaru and Y. Amir. In *Workshop on Large-Scale Distributed Systems and Middleware (LADIS12)*, Madeira, Protugal, July 2012.

I-3 Paxos for System Builders: An Overview. Y. Amir and J. Kirsch. In *Workshop on Large-Scale Distributed Systems and Middleware (LADIS08)*, Yorktown, NY, September 2008.

I-2 High Performance, Secure, Robust and Transparent Messaging service. Y. Amir, C. Danilov and C. Nita-Rotaru. In *International Workshop on Future Directions in Distributed Systems (FuDiCo02)*, Bertinoro, Italy, June 2002.

I-1 Highly Available Application in the Transis Environment. O. Amir, Y. Amir and D. Dolev. In *Proceedings of the Hardware and Software Architectures for Fault Tolerance Workshop (FTA93)*, LNCS 774, pages 125-139, Le Mont Saint-Michel, France, June 1993.

Thesis

Th-2 Replication Using Group Communication Over a Partitioned Network. Ph.D. Thesis, The Hebrew University of Jerusalem, August 1995.

Th-1 Customer Scheduling under Queuing and Delay Constraints. M.Sc. Thesis, The Technion, Israel Institute of Technology, June 1990.

Patents

P-13 US Patent 10990083 B2 (International Patent Application PCT/US18/15451). Systems and Methods for Cloud-Based Control and Data Acquisition with Abstract State. Y. Amir, A. Babay and T. Tantillo. Filed 1/2018, granted 4/2021.

P-12 US Patent 11140221 B2 (International Patent Application PCT/US17/38565). Network-Attack-Resilient Intrusion-Tolerant SCADA Architecture. Y. Amir, A. Babay and T. Tantillo. Filed 6/2017, granted 10/2021.

P-11 US Patent 9106569 B2. System and Method that Route Flows via Multicast Flow Transport for Groups. Y. Amir, J. Stanton, M. Miskin-Amir and J. Schultz. Filed 11/2013, granted 8/2015.

P-10 US Patent 8599851 B2. System and Method that Route Flows via Multicast Flow Transport for Groups. Y. Amir, J. Stanton, M. Miskin-Amir and J. Schultz. Filed 4/2010, granted 12/2013.

P-9 HK Patent 1156446. A System and Method for Recovery of Packets in Overlay Networks. Y. Amir, J. Stanton, J. Lane, and J. Schultz. Filed 12/2009, granted 8/2014.

P-8 UK Patent GB2478687. A System and Method for Recovery of Packets in Overlay Networks. Y. Amir, J. Stanton, J. Lane, and J. Schultz. Filed 12/2009, granted 5/2014.

P-7 US Patent 8437267 B2. System and Method for Recovery of Packets in Overlay Networks. Y. Amir, J. Stanton, J. Lane, and J. Schultz. Filed 12/2009, granted 5/2013.

P-6 US Patent 8181210 B2. Method for Delivery of Deadline-driven Content Flows over a Flow Transport System that Interfaces with a Flow Delivery System via a Selected Gateway. Y. Amir, M. Miskin-Amir, Y. Javadi, M. Khan and J. Stanton. Filed 8/2009, granted 5/2012.

P-5 HK Patent 1156447. Scalable Flow Transport and Delivery Network and Associated Methods and Systems. Y. Amir, M. Miskin-Amir, Y. Javadi, M. Khan and J. Stanton. Filed 7/2009, granted 2/2013.

P-4 UK Patent GB2478397 B. Scalable Flow Transport and Delivery Network and Associated Methods and Systems. Y. Amir, M. Miskin-Amir, Y. Javadi, M. Khan and J. Stanton. Filed 7/2009, granted 10/2012.

P-3 US Patent 8619775 B2. Scalable Flow Transport and Delivery Network and Associated Methods and Systems. Y. Amir, M. Miskin-Amir, Y. Javadi, M. Khan and J. Stanton. Filed 7/2009, granted 12/2013.

P-2 US Patent 8984297 B2. Authenticated Adversarial Routing. Y. Amir, P. Bunn and R. Ostrovsky. Filed 3/2009, granted 3/2015.

P-1 US Patent 7299219 B2. High Refresh-Rate Retrieval of Freshly Published Content Using Distributed Crawling. J. Green, J. Schultz, Y. Amir and M. Goodrich. Filed 5/2001, granted 11/2007.

Additional Technical Reports

TR-5 Paxos for System Builders. Y. Amir and J. Kirsch. Technical Report CNDS-2008-2, The Distributed Systems and Networks Lab, Johns Hopkins University, March 2008.

TR-4 The Spread Toolkit: Architecture and Performance. Y. Amir, C. Danilov, M. Miskin-Amir, J. Schultz and J. Stanton. Technical Report CNDS-2004-1, The Distributed Systems and Networks Lab, Johns Hopkins University, April 2004.

TR-3 Practical Wide-Area Database Replication. Y. Amir, C. Danilov, M. Miskin-Amir, J. Stanton and C. Tutu. Technical Report CNDS-2002-1, The Distributed Systems and Networks Lab, Johns Hopkins University, February 2002.

TR-2 The Spread Wide Area Group Communication System. Y. Amir and J. Stanton. Technical Report CNDS-98-4, The Distributed Systems and Networks Lab, Johns Hopkins University, October 1998.

TR-1 The Transis Approach to High Availability Cluster Communication. D. Malki, Y. Amir, D. Dolev and S. Kramer. Technical Report CS94-14, Institute of Computer Science, The Hebrew University of Jerusalem, October 1994.

Students

Students that completed graduate research with me:

- Sahiti Bommareddy. Ph.D. January 2025. Thesis: “Real-Time Byzantine-Resilient Power Grid Infrastructure”. Creator of Spire.
- Amy Babay. Ph.D. September 2018. Thesis: “Timely, Reliable, and Cost-Effective Internet Transport Service using Structured Overlay Networks”. Creator of Spines, Spire and Prime.
- Thomas Tantillo. Ph.D. September 2018. Thesis: “Intrusion-Tolerant SCADA for the Power Grid”. Creator of Spire, Prime and Spines.
- Daniel Obenshain. Ph.D. November 2015. Thesis: “Practical Intrusion-Tolerant Networking”. Creator of Spines.
- Jonathan Kirsch. Ph.D. February 2010. Thesis: “Intrusion Tolerant Replication Under Attack”. Creator of the Prime and STEWARD intrusion tolerant replication engines and the Paxos-SB replication engine.
- Raluca Musaloiu-Elefteri. Ph.D. January 2010. Thesis: “Practical Wireless Mesh Networks and Their Applications”. Creator of the SMesh wireless mesh network.
- John Lane. Ph.D. October 2008. Thesis: “Scaling Byzantine Replication to Wide-Area Networks”. Creator of the Prime and STEWARD intrusion tolerant replication engines.

- Nilo Rivera. Ph.D. October 2008. Thesis: “Seamless Connectivity and Mobility in Wireless Mesh Networks”. Creator of the SMesh wireless mesh network.
- Ciprian Tutu. Ph.D. December 2004. Thesis: “Distributed Algorithms for Consistent Replicated State”.
- Claudiu Danilov. Ph.D. September 2004. Thesis: “Performance and Functionality in Overlay Networks”. Creator and original architect of Spines.
- Cristina Nita-Rotaru. Ph.D. June 2003. Thesis: “High Performance Secure Group Communication”. Creator and architect of Secure Spread.
- Jonathan R. Stanton. Ph.D. February 2002. Thesis: “Practical Wide Area Group Communication”. Creator and architect of the Spread toolkit, Creator of Secure Spread.
- R. Sean Borgstrom. Ph.D. September 2000. Thesis: “A Cost-Benefit Approach to Resource Allocation in Scalable Metacomputers”.

- Jerry Chen. M.S.E. December 2021. Project: “Dependable AI for Traffic Light Control Systems”.
- Daniel Qian. M.S.E. August 2021. Project: “An Intrusion Tolerant Architecture and Protocol for Substation Protection”.
- Edmund (Ned) Duhaime. M.S.E. May 2017. Co-advised with Amy Babay. Study: “Seamless Overlays for Application Use”.
- Trevor Aron. M.S.E. May 2017. Co-advised with Thomas Tantillo. Project: “An Open-Source Event-Base SCADA System for the Power Grid”. Creator of Spire.
- Emily Wagner. M.S.E. December 2016. Co-advised with Amy Babay. Project: “The Playback Network Simulator: Overlay Performance Simulations with Captured Data”.
- Jeffrey DallaTezza. M.S.E. November 2015. Project: “Madaba: Starvation free, Scalable Transaction for Sharded Key-value Stores”.
- Amy Babay. M.S.E. May 2014. Thesis: “The Accelerated Ring Protocol: Ordered Multicast for Modern Data Centers”. Creator of the Accelerated Ring protocol in the Spread toolkit.
- Thomas Tantillo. M.S.E. July 2013. Thesis: “Intrusion-Tolerant Cloud Monitoring”. Creator of Spines.
- Michael Kaplan. M.S.E. June 2006. Study: “Low-Overhead Routing for High-Performance Wireless Mesh Networks”.
- Ryan Caudy. M.S.E. October 2004. Project: “Scalable Process Group Membership for the Spread Toolkit”. Creator of Wackamole.
- Michael Hilsdale. M.S.E. May 2004. Study: “Toward a Practical and Seamless Wireless Backbone”.
- Ashima Munjal. M.S.E. February 2004. Project: “A Highly Available Message Queue”. Creator of Wackamole and JMS4Spread.
- John L. Schultz. M.S.E. February 2001. Thesis: “Partitionable Virtual Synchrony Using Extended Virtual Synchrony”. Creator of Spread, creator and architect of Spines.

- Jacob Green. M.S.E. October 2000. Project: “Hyperdog: Up To Date Web Monitoring Through Metacomputers”.
- David Shaw. M.S.E. August 1998. Thesis: “Walrus – A Low Latency, High Throughput Web Service Using Internet-wide Replication”.

Additional people that conducted published research in my lab:

- Brian Wheatman (2019-2022). Graduate Student. Dependable AI.
- Samuel Beckley (2017-2018). Graduate Student. SCADA HMIs for the power grid.
- Dr. Marco Platania. (2012-2015). Post Doctoral Fellow. Intrusion-tolerant Systems. Creator of Prime.
- Dr. Claudiu Danilov (2004-2006). Research Scientist. Wireless mesh networks and scalable Byzantine replication. Creator of SMesh and Spines.
- Dr. Jonathan Stanton (2002). Assistant Research Professor. Secure group communication and overlay networks. Creator and architect of Spread.
- Theo Schlossnagle. (1997-2001). Graduate Student. Practical distributed information systems infrastructure. Creator of the widely used Backhand and Wackamole.
- Alec Peterson. (1997-1998). Undergraduate Student. Replicated web service.

External Grants

- Johns Hopkins PI (with DoD PI Imes Chiu) on a DoD grant titled “Severe Impact Resilience: Framework for Adaptive Compound Threats”, October 2020 – September 2023, $1,800,000 (Johns Hopkins contract - $340,000).
- Johns Hopkins PI (with Pacific Northwest National Laboratory PI Christopher Bonebrake) on a DoE grant titled “Grid Modernization Laboratory Consortium 5.1: Byzantine Security”, January 2020 – January 2023, $4,480,776 (Johns Hopkins contract - $749,897).
- Subcontract PI (with PI Kevin Jordan (Resurgo Inc)) on a DoD grant titled “Environmental Security Technology Certification Program (ESTCP) Energy and Water”, August 2016 – August 2018, $750,000 (Johns Hopkins part - $100,000).
- Co-PI (with PI Michael Dinitz) on an NSF grant (Algorithms in the Field program) titled “Wide-area Dissemination under Strict Reliability, Timeliness, and Cost Constraints”, September 2015 – August 2019, $400,000.
- Principal Investigator (with subcontract PI Cristina Nita Rotaru (Purdue), subcontract PI Michael Franz (University of California, Irvine), CO-PI Jennifer Neville (Purdue) and CO-PI Vladimir Braverman (Johns Hopkins)) on a DARPA grant (Mission-oriented Resilient Clouds program) titled “Toward Intrusion Tolerant Clouds”, November 2011 – September 2016, $4,092,152.
- Principal Investigator on an NSF grant (Cyber Trust program) titled “Scalable Byzantine Replication Under Attack”, August 2007 – July 2011, $500,000.

- Principal Investigator (with subcontract PI Brian Coan (Telcordia), PI Cristina Nita-Rotaru (Purdue) and PI Rafail Ostrovsky (UCLA)) on an NSF grant (Cyber Trust program) titled "A Survivable Information Infrastructure for National Civilian BioDefense", September 2004 – August 2008, $1,499,864.
- Principal Investigator (with Cristina Nita-Rotaru as subcontract PI from Purdue University) on a DARPA grant (Self Regenerative Systems program) titled "Scalability, Accountability and Instant Information Access for Network-Centric Warfare", June 2004 – January 2006, $1,048,478.
- CO-PI (with PI William Ball from Environmental Engineering and CO-PI Randal Burns from Computer Science at Johns Hopkins, and with PI Dominic Di Toro from U. Delaware, PI Michael Kemp from U. Maryland, and PI Tom Gross from Chesapeake Research Consortium) on NSF proposal titled "Concept Development toward a Collaborative Large-scale Engineering Analysis Network for Environmental Research (CLEANER) with a Focus on the Chesapeake Bay", June 2004 – May 2006, $70,000.
- Principal Investigator (with PI Baruch Awerbuch and CO-PI Jonathan Stanton) on a DARPA grant (Fault Tolerant Networks program) titled "A Cost-Benefit Approach to Fault Tolerant Communication and Information Access", May 2000 - September 2003, $944,015.
- Principal Investigator (with CO-PIs Baruch Awerbuch and Jonathan Stanton, and with Gene Tsudik as a subcontractor from UC Irvine) on a DARPA grant (Dynamic Coalitions program) titled "Efficient, Robust and Secure Group Communication for Dynamic Coalitions", (co-funded by the NSA) May 2000 – September 2003, $1,350,824.
- CO-PI (with PI Larry Wolff, and CO-PIs Michael Goodrich, Rao Kosaraju, Subodh Kumar, Russel Taylor, and David Yarowsky) on an NSF grant (CISE program) titled "A Networked Computing Environment for the Manipulation and Visualization of Geometric Data", September 1997 – August 2003, $1,226,381.
- Principal Investigator (with PI Baruch Awerbuch) on NSA grant (LUCITE program) titled "Alternative Approaches to Secure Multicast Routing", June 1998– June 2000, $239,557.
- CO-PI (with PI Baruch Awerbuch) on a DARPA grant (Quorum program), titled "End-to-End Resource Management for Metacomputers", August 1996 - May 2000, $999,953.
- Participant in the Intel equipment grant (led by Theodore Poehler), 1998 – 2000, $2,000,000 in equipment.
- Participant in the NSF vBNS grant (led by Theodore Poehler), titled "vBNS Connectivity for the Johns Hopkins University", September 1997 – August 1999, $350,000.
- Principal Investigator on a NASA/CESDIS grant, titled "Combining Satellite Communication in Commedia", July 1996 – June 1998, $57,563.

Other Funding

- PI (with JHU/APL PI Tamim Sookoor) on a Johns Hopkins Institute of Assured Autonomy grant titled "Assuring City-Scale Critical Infrastructure Systems", April 2020 – March 2022, $750,315 (DSN lab part - $243,112).
- Unrestricted gift of $3,000 awarded by Dr. Daniel Obenshain to support the DSN lab, 2019-2021.
- Unrestricted gift of $25,000 from AT&T to support cloud research, 2015.

- Johns Hopkins School of Engineering $10,000 equipment award for the Advanced Distributed Systems class, 2004.
- Unrestricted gift of $10,000 awarded by Mr. Kwok Li, Linsang Computing LLC, 1999.

Awards and Honors

* LTN Global Communications' global transport service reaches a notable milestone: a decade without even a single second of service outage, February 14, 2021. This was extended on February 14, 2025.
* Best Paper for "Tolerating Compound Threats in Critical Infrastructure Control Systems". S. Bommareddy*, M. Khan*, H. Nadeem*, B. Gibly, I. Chiu, J. W. van de Lindt, O. Nofal, M. Panteli, L. W. Wells II, Y.Amir and A. Babay. International Symposium on Reliable Distributed Systems (SRDS24), 2024.
* Best Paper (out of 531 submissions) for "Timely, Reliable, and Cost-Effective Internet Transport Service using Dissemination Graphs". A. Babay, E. Wagner, M. Dinitz and Y. Amir. IEEE International Conference on Distributed Computing Systems (ICDCS), 2017.
* Best paper nomination for "Towards a Practical Survivable Intrusion Tolerant Replication System". M. Platania, D. Obenshain, T. Tantillo, R. Sharma and Y. Amir. IEEE International Symposium on Reliable Distributed Systems (SRDS), 2014.
* Recipient of the Alumni Association Excellence in Teaching Award, the highest teaching award in the Whiting School of Engineering, Johns Hopkins University, 2014.
* Finalist, Excellence in Mentoring and Advising Award, Whiting School of Engineering, Johns Hopkins University, 2014.
* Intrusion-tolerant Spines selected to be presented at the DARPA Demo Day at the Pentagon, May 2014.
* Finalist, Excellence in Teaching Award, Whiting School of Engineering, Johns Hopkins University, 2013.
* Award paper for "Scaling Byzantine Fault-Tolerant Replication to Wide Area Networks". Y. Amir, C. Danilov, D. Dolev, J. Kirsch, J. Lane, C. Nita-Rotaru, J. Olsen and D. Zage. International Conference on Dependable Systems and Networks (DSN), 2006.
* Nominated to the DARPA "Performer with Significant Technical Achievement" award, 2004. From the notification message: "This is an annual award, made to the DARPA researcher who made the most significant technical contributions to the DARPA research goals and the Defense Department."
* Secure Spread selected by DARPA as one of 12 technologies appearing on a DVD summarizing the accomplishments of 6 DAPRA programs (Cyber Panel, Dynamic Coalitions, Chats, OASIS, Fault Tolerant Networks, and IA OPX), 2003.
* Recipient of the DARPA Dynamic Coalitions program "Bytes for Buck" trophy, 2002.
* Best paper nomination for "Exploring Robustness in Group Key Agreement". Y. Amir, Y. Kim, C. Nita-Rotaru, J. Schultz, J. Stanton and G. Tsudik, IEEE International Conference on Distributed Computing Systems (ICDCS), 2001.
* The Technion President's Honor List, 1985.
* The Technion Dean's Honor List, 1983, 1984.

External Professional Service

* Member, The National Academies' Forum on Cyber Resilience, February 2019 – March 2025.
* General Co-Chair for the *IFIP/IEEE International Conference on Dependable Systems and Networks* (DSN22), Baltimore, June 2022.
* Advisory Board, Pearl Center on Critical and Extreme Security and Dependability (CritiX), University of Luxembourg, February 2016 – May 2022.
* Program Committee member for the *IFIP/IEEE International Conference on Dependable Systems and Networks* (DSN20), Valencia, Spain, June 2020.
* Steering Committee member for the *IFIP/IEEE International Conference on Dependable Systems and Networks* (DSN), February 2011 – December 2019.
* Vice Chair, IFIP Working Group 10.4 on Dependable Computing and Fault Tolerance, January 2016 – December 2018.
* Program Committee member for the *IFIP/IEEE International Conference on Dependable Systems and Networks* (DSN18), Luxembourg, June 2018.
* Program Committee member for the *IFIP/IEEE International Conference on Dependable Systems and Networks* (DSN17), Denver, CO, June 2017.
* Program Committee Co-Chair for the *IFIP/IEEE International Conference on Dependable Systems and Networks* (DSN15), Rio de Janeiro, Brazil, June 2015.
* Program Committee member for the *IFIP/IEEE International Conference on Dependable Systems and Networks* (DSN14), Atlanta, GA, June 2014.
* Associate Editor, the *IEEE Transactions on Dependable and Secure Computing* (TDSC), January 2010 – December 2013.
* Panelist for an NSF program in 2013.
* Program Committee member for the Network and Distributed System Security Symposium (NDSS13), San Diego, CA, February 2013.
* Program Committee member for the Workshop on Hot Topics in Systems Dependability (HotDep12), Hollywood, CA, October 2012.
* Program Committee member for the *IEEE International Conference on Distributed Computing Systems* (ICDCS12), Macau, China, June 2012.
* Panelist for an NSF program in 2010.
* Program Committee member for the *IEEE International Conference on Distributed Computing Systems* (ICDCS09), Montreal, Canada, June 2009.
* Program Committee member for the Workshop on Hot Topics in Systems Dependability (HotDep08), San Diego CA, December 2008.
* Panelist for an NSF program in 2008.
* Program Committee member for the *IEEE International Conference on Distributed Computing Systems* (ICDCS07), Toronto, Canada, June 2007.
* Panelist for NASA Applied Information Systems Research (AISR) program in 2007.

* Program Committee member for the *IEEE International Conference on Distributed Computing Systems* (ICDCS06), Lisbon, Portugal, July 2006.
* Program Committee member for the ACM Workshop on Wireless Security (WiSe05), September 2005.
* Program Committee member for the *IEEE International Conference on Dependable Systems and Networks* (DSN05), Yokohama Japan, June 2005.
* Program Committee member for the *IEEE International Conference on Distributed Computing Systems* (ICDCS05), Columbus OH, June 2005.
* Program Committee member for the ACM Workshop on Wireless Security (WiSe04), Philadelphia PA, September 2004.
* Program Committee member for the ACM Workshop on Wireless Security (WiSe03), San Diego CA, September 2003.
* Program Committee member for the *IEEE International Conference on Dependable Systems and Networks* (DSN03), San Francisco, June 2003.
* Program Committee member for the DARPA Information Survivability Conference and Exposition (DISEX03), Washington DC, April 2003.
* Panelist for two NSF Small ITR programs in 2003.
* Program Committee member for the ACM Workshop on Wireless Security (WiSe02), Atlanta GA, September 2002.
* Program Committee Vice Chair, Network Protocols, for the *IEEE International Conference on Distributed Computing Systems* (ICDCS02), Vienna Austria, July 2002.
* Local Arrangements Chair for the *IEEE International Conference on Dependable Systems and Network* (DSN02), Washington DC, June 2002.
* Member of the EU-NSF panel on Middleware for Mobile Systems, organized by the European Research Consortium for Informatics and Mathematics (ERCIM) with support of the US National Science Foundation to discuss future collaborative R&D directions, 2002.
* Panelist for NSF Medium ITR program in 2002.
* Program Committee member for the *ACM Symposium on Principles of Distributed Computing* (PODC01), Newport RI, August 2001.
* Program Committee member for the *IEEE International Conference on Dependable Systems and Networks* (DSN01), Goteborg, Sweden, July 2001.
* Program Committee member for the *IEEE International Conference on Distributed Computing Systems* (ICDCS99), Austin, June 1999.
* Panelist for two DARPA Information Assurance and Survivability programs, 1999.
* Program Committee member for the *International Conference on Distributed Computing* (DISC98), Andros, Greece, October 1998.
* Local Arrangements Chair for the *IEEE International Conference on Distributed Computing Systems* (ICDCS97), Baltimore, June 1997.

Internal Service

* Director, the Distributed Systems and Networks lab (DSN) at the Whiting School of Engineering, Johns Hopkins University (www.dsn.jhu.edu) (9/95 – 2/25).
* Committee Member, Computer Science Masters Admission (9/20 – 1/23).
* Committee Member, Homewood Faculty Assembly's ad-hoc Finance Committee (9/20 – 3/21).
* Committee Member, Computer Science Faculty Hiring (1/96 – 6/99, 10/05 – 10/06, Chair 12/15 – 12/16, 12/19 – 6/20).
* Committee Member, Johns Hopkins University, Homewood Schools, Conflict Review Committee (3/14 – 12/18).
* Chair, Department of Computer Science (www.cs.jhu.edu) (6/15 – 6/18).
* Committee Member, Johns Hopkins Computer Engineering Program (9/97 – 6/09, 9/13 – 6/18).
* Committee Member, Computer Science Curriculum Committee (10/12 – 6/15).
* Committee Member, Johns Hopkins Homewood Graduate Board (9/11 – 9/14).
* Chair, Johns Hopkins Engineering Faculty Assembly (9/04 – 12/07).
* Committee Member, Computer Science Graduate Admission (12/98 – 4/01).

Additional Experience

Co-founder, LTN Global Communications Inc., February 2008 - Present.

Co-founded LTN Global Communications (LiveTimeNet) to bring a global real-time broadcast-quality video transport and delivery service to the marketplace. The service is used by major broadcasters and media companies such as Disney, YouTube TV, CNN, Fox, ABC, CBS, CNBC, ESPN, NBC, PBS, Bloomberg and Turner. (www.ltnglobal.com).

On February 14, 2021, LTN's global transport service reached a notable milestone: a decade without even a single second of service outage. This was extended on February 14, 2025.

Co-founder, Spread Concepts LLC, March 2000 - Present.

Co-founded Spread Concepts LLC to bridge the gap and create cross-fertilization between the real world and academic research and technologies (www.spreadconcepts.com).

Staff Scientist, CESDIS NASA, September 1995 – August 1997.

Staff Scientist at the Center of Excellence in Space Data and Information Sciences, The Goddard Space Flight Center, NASA, Greenbelt Maryland.

Consultant, June 1991 – August 1995.

Consultant in the areas of Distributed Systems, *C3I* systems, communication systems, operating systems and database systems. Clients included the Israel Aircraft Industries, E&M Computing (Sun Microsystems exclusive representative in Israel), and Applicom Systems (Informix exclusive representative in Israel).

Director of Development for a *C3I* system, IDF, May 1989 – May 1991.

In charge of the design, implementation, and deployment of a large and geographically distributed *C3I* system, for the Israeli Defense Force (IDF). The system's main goal was information dissemination (graphics and text) and data replication over an unreliable communication medium in a dynamic environment. The position involved heading three software development groups and a system support group. My six years (see immediately below) at the IDF culminated in the delivery of a fully operational system to the customer.

Project Leader, IDF, July 1985 – May 1989.

Project leader, in charge of research and development for the above *C3I* system.