

# Eve Meryl Schooler

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## EDUCATION:

**Ph.D. Computer Science, California Institute of Technology, Pasadena, CA.**

Ph.D. Thesis: "Why Multicast Protocols (Don't) Scale:

An Analysis of Multipoint Algorithms for Scalable Group Communication"

M.S. Thesis: "A Multicast User Directory Service for Synchronous Rendezvous"

Advisor: K. Mani Chandy

**M.S. Computer Science, University of California, Los Angeles, CA.**

Thesis: "Distributed Debugging in a Loosely-Coupled Processing System"

Advisor: Leonard Kleinrock

**B.S. Computer Science, Yale University, New Haven, CT.**

Thesis: "Peep-hole Optimization for the "T" Compiler"

Advisor: Joseph Fisher

## WORK EXPERIENCE:

- 6/18- **Principal Engineer and Director, Emerging IoT Networks, Intel Next Generation & Standards**  
Santa Clara, CA. Developing architectural building blocks to evolve the Internet toward a Sustainable Edge-to-Cloud continuum. Responsible for setting technical and strategic direction for IoT standards, bridging upper layer IoT and lower layer networking. Focused on data stewardship, dynamic IoT Edge architecture, holistic QoS, and the automation of energy & carbon footprint reporting. Grounding in Industrial IoT and Video analytics use cases, alongside carbon-neutral computing. Co-chairing the IETF Reliable & Available Wireless (RAW) working group to support L3 time sensitive networks and the Computing-in-the-Network (COIN) research group to examine the convergence of networking-compute-storage. Co-recipient of 2020 IEEE Internet award.
- 1/15-6/18 **Principal Engineer and Director of Research in Emerging Architectures, Intel Internet of Things Group**, Santa Clara, CA. Led pathfinding focused on the network, storage and data architecture required to evolve the Cloud toward Edge and Fog Computing, while supporting trusted analytics. Managed a technical team that worked on Real-time Visual Fog support for interactive and remote control of devices and data. Drove R&D on Reverse Content Distribution Networks (rCDNs) for aggregation of upstream IoT data flows, Smart Objects for semantic interoperability, Data life cycle management including privacy preservation, and Bootstrapping IoT trustworthiness in intermittently disconnected (mobile) contexts. Drove multi-year pathfinding that led to investment and launch of \$6.5M joint Intel-NSF ICN-WEN program (information-centric networking in wireless edge networks), serving on BoA.
- 1/14-12/14 **Principal Engineer and Senior Architect, Intel Software & Services Group**, IoT Device Services, Santa Clara, CA. Evaluated suitability of data-centric networking and privacy-preserving encryption on energy-constrained mobile devices. Drove development of trusted data management solutions, reputation services, an observation- and measurement-based IoT trust calculus, leading to business unit adoption of an information-centric networking (ICN) publish-subscribe middleware solution.
- 10/10-12/13 **Principal Engineer and Project Lead, Intel Labs**, Energy & Sustainability Lab, Santa Clara, CA. Led the Trusted Personal Cloud project to architect and to build the trusted communication infrastructure for the Smart home and Smart city. Innovated at the Smart Grid edge by combining information-centric networking (ICN) with attribute-based encryption (ABE) to enable self-securing data with high availability. Led research team that delivered scalable data privacy and visualization solutions, quantified energy savings from presence detection in the Smart home, implemented middleware-agnostic privacy and security library, demonstrated inference-based personal cloud formation and showcased privacy-preservation in neighborhood-coordinated Electric Vehicle Charging use case. Targeted deployment pilot for DoE-funded Pecan Street smart neighborhood trials.

- 4/08-10/10 **Principal Engineer and Project Lead, Intel Research**  
 1/05-4/08 **Senior Research Scientist and Project Lead, Intel Research**, Distributed Detection & Inference project, Communication Technology Lab, Corporate Technology Group, Santa Clara, CA. Led team of researchers focused on collaborative network anomaly detection in large-scale Enterprise networks, combining machine learning with distributed networking techniques using a fully distributed end-host architecture. Targeting zero-day attacks, algorithms reduced false positives (1000x), detected two orders of magnitude stealthier malware, with nearly 95% reduction in the percentage of the network infected at time of detection. Drove the collection of a unique dataset derived from mobile end-host user network traffic traces that led to insights into malware and botnet behavior, and demonstrated data as a service (Division Recognition Award). Improved performance further through biased messaging, real-time adaptation, and clustering. Matured system into proof of concept in year-long trial deployment with British Telecom, a major European service provider.
- 6/04-12/04 **Consultant, Pollere Inc.**, Menlo Park, CA. Performed extensive comparative analysis of network simulation tools to support the Transformation Communications Satellite (TSAT) system. Resultant white paper and recommendations contributed to Lockheed-Martin winning \$40M DARPA funding due to superior risk analysis compared to competitors.
- 9/01-7/03 **Principal Technical Staff Member, AT&T Labs-Research**, Internetworking Research Department, Menlo Park, CA. Designed an aggregation architecture for efficient feedback in large N-to-1 communication systems. Augmented Real-time Transport Control Protocol (RTCP) to improve scaling techniques and to support operation in constrained topologies, such as source-specific multicast (SSM) and satellite networks, and subsequently applied to contexts such as wide-area network monitoring and sensor networks. Widely deployed in IPTV distribution systems, the extensions were adopted as a standard in the IETF (RFC 5760). Implemented passive end-system monitoring of peer-to-peer (p2p) traffic for improved network provisioning. Derived preliminary workloads by tracking p2p client signaling protocol activity in Internet-scale experiments.
- 9/94-7/01 **Research Assistant, Computer Science Department, Caltech**, Pasadena, CA, Infosphere Project. Focused on issues in scalable distributed control, network performance analysis, resource discovery, multicast and Web-based telecollaboration, session agreement protocols and media synchronization (9/94-12/00). Teaching Assistant for CS128 Algorithms, core class on sequential, distributed and parallel algorithms ('95-'96, '98). Advisor, Caltech Summer Research Program in Parallel Computing for Undergraduate Women and Minorities, supervising visiting undergraduates. Implemented a distributed network monitoring application for computer theft detection, a multicast dynamic LDAP (light-weight directory access protocol) directory service, an accompanying user interface, and a fault tolerant collaborative Web browser (Summers '95, '98, '99).
- 5/97- 8/97 **Summer Intern, Microsoft Research**, Telepresence Research Group, Bay Area Research Center, San Francisco, CA. Developed a multicast forward error correction (FEC) protocol for scalable Web file distribution to solve the "Midnight Madness" problem (e.g., a million synchronous requests for the latest software release of the OS, browser, or other popular web-based content) and to support large-scale one-to-many telepresentations. Demonstrated in multicast version of the Powerpoint application.
- 5/96- 8/96 **Summer Intern, Hewlett-Packard Laboratories**, Broadband Information Systems Lab, Palo Alto, CA. Investigated Quality of Service (QoS) in the Internet and its impact on the design of a hybrid fiber coax (HFC) system to the home. Created an experimental testbed for protocol analysis.
- 3/88-12/95 **Member Technical Staff, USC/Information Sciences Institute**, Multimedia Conferencing Project, Networking Division, Marina del Rey, CA. Drove the design of a session control protocol for operation over wide area packet networks that supported multiway conference establishment, propagated quality of service information, negotiated heterogeneous site configurations, and resynchronized state as needed. Led to co-authorship of IETF Session Initiation Protocol (SIP), widely used standard for VoIP (RFCs 2543 and 3261). Pioneered and implemented evolving protocol in early workstation-based teleconferencing tool over experimental Internet (MBone), combining real-time voice and video with shared computer workspaces. Publicly released software to Internet community. Demonstrated results in (earliest known) Internet-wide distributed music performances, to showcase synchronization algorithms.

- 9/85-2/88 **Research Assistant, Computer Science Department, UCLA**, Los Angeles, CA, Advanced Teleprocessing Group. Developed the Benevolent Bandit Laboratory, a loosely-coupled testbed for distributed algorithms that took advantage of idle CPUs in a local area network of microcomputers and provided fault tolerance through redundancy. Thesis work created a distributed debugger and monitor to examine the impact of interprocess communication (1/87-2/88). Sysadmin in Artificial Intelligence Lab maintaining network of Apollo workstations (9/85-12/86).
- 8/83-7/85 **Software Engineer, Apollo Computer**, Operating Systems Group, R&D, Chelmsford, MA. Ported and integrated non-kernel Unix functions into Apollo's Aegis distributed operating system. Member of the design team that implemented a co-resident version of Berkeley 4.2 and Bell System V Unix. Responsible for portions of the process fault manager and global libraries. Co-composer, "A Long Ray's Journey into Light", SIGGRAPH'05 animation, which synthesized the accompanying graphics and music using spare cycles across the network.

## HONORS

IEEE Fellow (2021)  
 IEEE Internet Award, Co-recipient (2020)  
 Intel "High-5 Award", Intel Patent Group, for 5 or more accepted patents / year (2018, 2019)  
 Intel Division Recognition Award, Tech Symposium Chair, Womens PE & Fellows Forum (2018)  
 Intel "Top 3 Inventor" Recognition, Internet of Things Group (IoT), 16 patents filed (2016)  
 Intel Division Collaboration Award, IoT Group (2016)  
 Intel Division Recognition Award, IoT Group, NIST Cyber-Physical Systems Architecture Framework (2016)  
 Intel Achievement Award, ROAR program coach to retain senior technical women (2015)  
 Intel Division Recognition Award, Intel Labs, Forbidden City Dataset (2007)  
 Microsoft Graduate Fellowship (1997-1999)  
 Caltech Earl C. Anthony Scholarship (1994-1995)  
 American Association of University Women (AAUW), Educational Foundation Fellowship (1994-1995)  
 George Tasic Science Scholarship (1979-1981)

## RELATED ACCOMPLISHMENTS:

**Intel:** Intel RISE 2030 Technology Initiative, Sustainability Committee (2021-); Patent Review Committees, Edge Networking & Applications (2018-), Automotive, Drones, & Robotics (2017-2018); Corporate Research Council (CRC), Emerging Ingredients Committee (2016-), grant sponsorship for research at UC Santa Cruz, Yale, Stanford, Northeastern, ACM ICN (2018-2021), ACM/IEEE SEC (2020-2021), jointly with Next Generation and Standards BU; CRC Software and Systems, Center review committee (2017); IoT Group grant sponsorship of research at CMU, NDN Consortium, ACM ICN (2014-2017); Intel Environmental Excellent Awards Committee (2011, 2012); University Research Office grant sponsorship for research at MIT, CMU, UCB LoCal (2010-2013). Intel Research Council, Communications Committee, grant sponsorship for external research at MIT, Dartmouth, UC Davis, CAIDA/UCSD membership (2005-2009).

**IETF/IRTF** (Internet Engineering Task Force/Internet Research Task Force) Standards Organization: Co-chair, Reliable & Available Wireless (RAW) working group (2/20-); Co-chair, Compute in the Network (COIN) research group (2/19-); Member, Internet of Things (IoT) Directorate (2017-); Co-founder and Co-chair, Multiparty, Multimedia Session Control (MMusic) working group (3/93-10/99); Co-founder and Co-chair, Conference Control (ConfCtrl) research group (1992); Member, Transport Area Directorate (1994-1997).

**NSF** (National Science Foundation): Board of Advisors, Intel-NSF joint program on Information-Centric Networking in Wireless Edge Networks (ICN-WEN) (2017-2020); Industry panelist, Role of Information Sciences and Engineering in Sustainability (RISES) workshop (2011); Technical Advisor, Wireless Nano-Bio-Info Sensors and Systems Program (2008-2009); Reviewer, Aware Networking (ANET) program area (2008); Member, Committee of Visitors for CISE/ANIR (2003).

**NIST** (National Institute of Standards): Co-chair, Data Interoperability working group, Cyber-Physical Systems Initiative (2014-2016).

**OpenFog Consortium:** Co-chair SW Infrastructure WG's Task Group on Smart Objects for Fog Computing (2017).

**Editorial Boards:** Guest Editor, IEEE Network Magazine, Special issue on Computing in the Network (COIN) (to appear 2021); Associate Editor, ACM Transactions on Internet Technology (ToIT) (2017-2020); Guest Editor, ACM ToIT, Special issue on Evolution of IoT Networking, Vol.20, No.3 (Oct 2020); Reviewers Board, IEEE Network Magazine (2016); Guest Editor, IEEE Pervasive Computing, Special issue on Smart Energy Systems, Vol.10, No.1 (2011).

**Board of Advisors:**

Computing Research Association (7/21-), Board of Directors; EU H2030 SPATIAL (Security and Privacy Accountable Technology Innovations, Algorithms and ML) project, BoA member, Delft University of Technology, Netherlands (2020-).

**Technical Program Committees (TPCs) and other Leadership Positions:** ACM European Conference on Computer Systems (EuroSys) International Workshop on Edge Systems, Analytics and Networking (EdgeSys'21); IEEE/ACM Symposium on Edge Computing (SEC'21, **Industry panel chair '20**); Dagstuhl Seminar on Compute-First Networking (**Co-organizer, 6/21**); IEEE Global Communications Conference (Globecom) Workshop on Information-Centric Edge Computing (ICEC **Steering committee '19**); IEEE International Conference on Fog & Mobile Emerging Networks (FMEC'18,'19); IEEE International Symposium on Local & Metropolitan Area Networks (LANMAN'18,'19,'20,'21); ACM CoNext Workshop on Emerging in-Network Computing Paradigms (CoNext ENCP'19); ACM BuildSys'19, Workshop on Device-Free Human Sensing (BuildSys DFHS'19,'20); IEEE International Conference on Communications (ICC'18) Workshop on ICN Solutions for Real-world Applications (ICC ICN-SRA'18); Network and Distributed System Security Symposium (NDSS) Workshop on Decentralized IoT Security and Standards (NDSS DISS'17,'18); ACM International Conference on Information Centric Networking (ACM ICN'14,'16,'17,'18, '20,'21, **Demo & Posters co-chair '15, Industry panel co-chair '19**); IEEE International Conference on Distributed Computing Systems (ICDCS'17,'18), Edge and Fog Computing track; IFIP Networking'17, Workshop on Information-Centric Fog Computing (Networking ICFC'17); EAI International Conference on Mobile Computing, Applications and Services (Mobicase'16,'18); Annual Mediterranean Ad Hoc Networking Workshop (MedHocNet, **Workshop co-chair '14**); IEEE Infocom Workshop on Name-Oriented Mobility: Architectures, Algorithms and Applications (Infocom NOM'14,'16,'17); NDN Community meeting (NDNComm'15,'17, **Industry panel chair '17**); ACM Workshop on Cyber-Physical System Security and Privacy (CPS-SPC'15); IEEE International Conference on Smart Grid Communication (SmartGridCom, **TPC co-chair '13**); ACM International Conference on Future Energy Systems (e-Energy'10 & '11, **Industry liaison '12**); IEEE International Symposium on a World of Wireless Mobile and Multimedia Networks (WoWMoM'09); IEEE Globecom (GCC'17) workshop on Named Data Networks for Challenged Communication Environments (NDN-CCE'17); IEEE Infocom Global Internet Symposium (GI'01); IEEE International Conference on Multimedia Computing Systems (ICMCS'99); ACM International Conference on Multimedia (MM'95); ACM 5th International Workshop on Networking and OS Support for Digital Audio and Video (NOSSDAV '94).

**Reviewer:** IEEE/ACM Transactions on Networking, Journal of Internetworking, ACM Transactions on Internet Technology, IEEE Transactions on Mobile Computing, IEEE Computer, IEEE Parallel and Distributed Technology, IEEE Internet Computing, Cluster Computing, IEEE Multimedia Journal, ACM SIGCOMM, IEEE INFOCOM, IEEE ICC ICN-SRA, IEEE Globecom, IEEE Globecom NDN-CCE, IEEE Global Internet Symposium, IEEE FMEC, ACM CoNext ENCP, ACM EuroSys EdgeSys, ACM ICN, ACM Multimedia, ACM Mobisys (Demos), ACM BuildSys DFHS, IEEE ICMCS, IEEE ICDCS, IEEE LANMAN, ACM NOSSDAV, IEEE ComSoc Multimedia Workshop, ACM e-Energy, IEEE SmartGridComm, EAI MobiCase, IEEE Communication Magazine, Elsevier Computers & Security Journal, Elsevier Computer Networks Journal, NSF grant proposals and CAREER grants, SRC (Semiconductor Research Center) I3T (Innovation and Intelligent IoT) proposals, DoE PSERC (Power Systems Engineering Research Center) whitepapers.

**Expert Witness** on VoIP (Voice over IP): Pragmatus vs Yahoo! (2/13-5/14); Tandberg vs Collaboration Properties Inc/Avistar (12/06-2/07).

**Professional Societies:** Member, Sigma Xi Scientific Research Honors Society; Member, Association for Computing Machinery (ACM); Fellow, Institute of Electrical and Electronics Engineers (IEEE).

**Volunteer:** Anita Borg Institute, BRAID liaison (2020); Mentor, UPWARD U.N.I.T.E.S., Intel-University Santa Clara partnership; Grace Hopper Conference <<http://www.gracehopper.org>>; Career Panel, Girl-serving Organizations (GHC'20); Technical Panels, Partner Collaboration Forum (GHC'16, GHC'17, GHC'19); New Investigators Committee (GHC'08); Co-Chair, Invited Technical Talks Committee (GHC'07); Publications Chair (GHC'05), Web Designer and Host for resume database (GHC'02). Mentor, MentorNet ('02-'04); Workshop Instructor, "Music and Computer Networks: Friends or Foes?", Sally Ride Science Festival for Middle School

Girls, Stanford, CA; Web Designer and e-mail sysadmin, Children's Center at Caltech, "http://www.its.caltech.edu/~ccenter" (10/98-09/01 ); Tutor, California Literacy Project ('89-'91).

**Musician:** Board member, Ragazzi Boys Chorus (2014-2018); Instrumentalist, Internet distributed music performance, ACM MM '94 (10/94), DARTnet demo (12/92). Collaborator, cyber music composition for the BodySynth, an alternate I/O device that creates sound through movement (6/93). Summer student, Center for Computer Research in Music and Acoustics (CCRMA), Stanford University, session on Synthesis and Composition on Small Advanced Systems (7/86). Co-composer, SIGGRAPH '85 animation "A Long Ray's Journey into Light", synthesized the accompanying music score with UC San Diego CMUSIC computer-based software. Performer and musical arranger, Yale acappella singing groups, Whim 'n Rhythm ('83) and Something Extra ('80-'82). Co-chairperson ('83) and Member ('79-'83), Yale Guild of Carillonners. Member, Yale Glee Club ('80). Graduate, Manhattan School of Music, Preparatory Division, New York, NY, student in piano, music composition and music theory ('75-'79).

## **PUBLICATIONS:**

### **Journals and Other Refereed Publications:**

Eve M. Schooler, Rick Taylor, "The IETF Reliable and Available Wireless (RAW) working group", *IEEE Communications Standards Magazine* (Dec 2020).

Rute C. Sofia, Eve M. Schooler, Dirk Kutscher, Chris Winkler, "Introduction to the Special Issue on Evolution of IoT Networking", *Transactions on Internet Technology (ToIT)*, Vol. 20, No.3 (Oct 2020).

M. Mirshekari, S. Pan, J. Pagert, E.M. Schooler, P. Zhang, H.Y. Noh, "Occupant Localization Using Footstep-Induced Structural Vibration", *Mechanical Systems and Signal Processing*, Vol.112, pp.77-97 (2018).

Eve M. Schooler, Jianqing Zhang, Adedamola Omotosho, Jessica McCarthy, Meiyuan Zhao, Qinghua Li, "The Trusted Personal Energy Cloud for the Smart Home", *Intel Technology Journal*, Special Issue on Sustainable Intelligent Systems, Vol.16, No.3, pp.14-26 (July 2012).

Joseph A. Paradiso, Prabal Dutta, Hans Gellersen, Eve M. Schooler, "Guest Editors' Introduction: Smart Energy Systems", *IEEE Pervasive Computing*, Vol. 10, No.1 (2011).

R. Want, E. Schooler, L. Jelinke, J. Jung, D. Dahle, U. Sengupta, "Ensemble Computing: Opportunities and Challenges", *Intel Technology Journal* (Oct 2010).

Jaideep Chandrashekar, Carl Livadas, Steve Orrin, Eve M. Schooler, "The Dark Cloud: Understanding and Defending against Botnets and Stealthy Malware", *Intel Technology Journal*, Vol.13, No.2 (2009). *Excerpt appeared on Harvard Business Review web site* (June 2009).

Eve M. Schooler, C. Livadas, J. Kim, P. Gandhi, P.R. Passera, J. Chandrashekar, S. Orrin, M. Koyabe, F. El-Moussa, G. Dabibi, "Collaborative Defense as a Pervasive Service: Architectural Insights and Validation Methodologies of a Trial Deployment", *International Journal of Sensor Networks*, Vol.8, No.2, pp.65-76 (2010); a shorter version appeared in *Proceedings IEEE 5<sup>th</sup> International Conference on Testbeds and Research Infrastructures for the Development of Networks and Communities* (TridentCom'09), *Proceedings First International Workshop on Pervasive Computing Systems and Infrastructures*, (PCSI'09), Washington, DC (April 2009).

John Mark Agosta, Jaideep Chandrashekar, Denver Dash, Manish Dave, David Durham, Hormuzd Khosravi, Hong Li, Stacy Purcell, Sanjay Rungta, Ravi Sahita, Uday Savagaonkar, Eve M. Schooler, "Autonomic Enterprise Security: Distributed Detection, Self-Defending Platforms and Adaptive Feedback", *Intel Technical Journal*, volume 10, number 4 (Nov 2006).

Gemmell, J., Schooler, E., and Gray, J., "Fcast Multicast File Distribution", *IEEE Network*, Vol.14, No.1, pp.58-68 (Jan/Feb 2000).

Gemmell, J., Schooler, E., and Kermode, R., "An Architecture for Multicast Telepresentations", *Journal of Computing and Information Technology*, Vol. 6, No. 3, pp. 255-272 (July 1998).

Chandy, K.M., Rifkin, A., Schooler, E.M., "Using Announce-Listen with Global Events to Develop Distributed Control Systems", *Concurrency: Practice and Experience*, Vol.10, No.11-13, pp. 1021-1027 (Sept-Nov 1998); also appeared in *Proceedings of the ACM Workshop on High Performance Java Network Computing*, Palo Alto, CA (Feb 1998).

Schooler, E.M., "Conferencing and Collaborative Computing", *Multimedia Systems Journal*, Vol. 4, No. 5, pp. 210-225 (Oct 1996); also **invited white paper**, *Proceedings of Dagstuhl International Workshop on Fundamentals and Perspectives on Multimedia Systems*, pp. 175-208, Dagstuhl, Germany (July 1994).

Schooler, E.M., "The Impact of Scaling on a Multimedia Connection Architecture", *Multimedia Systems Journal*, **invited paper**, Vol.1, No.1, pp.2-9 (Jan 1993); Technical Report ISI/RS-93-360, USC/ISI, Marina del Rey, CA (Aug 1993); a shorter version appeared in the *Proceedings of the ACM 3rd International Workshop on Network and Operating System Support for Digital Audio and Video*, NOSSDAV'12, San Diego, CA (Nov 1992).

Schooler, E.M., "Case Study: Multimedia Conference Control in a Packet-switched Teleconferencing System", *Journal of Internetworking: Research and Experience*, Vol. 4, No. 2, pp. 99-120 (Jun 1993), superseded by *IEEE/ACM Trans. on Networking*; Technical Report ISI/RS-93-359, USC/ISI, Marina del Rey, CA (Aug 1993).

Schooler, E.M., Casner, S.L., "An Architecture for Multimedia Connection Management", *ACM SIGCOMM Computer Communication Review*, Vol. 22, No. 3 (July 1992); *Proceedings of the 4th IEEE ComSoc International Workshop on Multimedia Communications*, Monterey, CA, (Apr 1992); Technical Report ISI/RS-92-294, USC/ISI, Marina del Rey, CA (Apr 1992).

Felderman, R.E., Schooler, E.M., Kleinrock, L., "The Benevolent Bandit Laboratory: A Testbed for Distributed Algorithms", *IEEE Journal on Selected Areas in Communications*, Vol. 7, No. 2, pp. 303-311 (Feb 1989).

### Conferences and Workshops:

Eve M. Schooler, Dave Zage, Hassnaa Moustafa, Jeff Sedayao, "A Marauders Map for the IoT Edge", **invited paper**, *IEEE International Conference on Collaboration and Internet Computing*, CIC'19, Los Angeles, CA (Dec 2019).

Eve M. Schooler, Milan Milenkovic, Keith A. Ellis, Jessica McCarthy, Jeff Sedayo, Brian McCarson, "Rational Interoperability: A Pragmatic Path Toward a Data-Centric IoT", **invited paper**, *IEEE International Conference on Distributed Computing Systems*, ICDCS'18, pp.1139-1149 (Oct 2018).

Hassnaa Moustafa, Eve M. Schooler, Jessica McCarthy, "rCDN for Fog Computing: The Data Lifecycle of Video in Connected and Autonomous Vehicles", **invited paper**, *Fog World Congress*, FWC'17 (Oct 2017).

Eve M. Schooler, David Zage, Jeff Sedayao, Hassnaa Moustafa, Andrew Brown, Moreno Ambrosin, "An Architectural Vision for a Data-Centric IoT: Rethinking Things, Trust and Clouds", **invited paper**, *IEEE International Conference on Distributed Computing Systems*, ICDCS'17, pp.1717-1728 (June 2017).

Hassnaa Moustafa, Eve M. Schooler, Geng Shen, Sanjana Kamath, "Remote Monitoring and Medical Devices Control in eHealth", *12<sup>th</sup> IEEE International Conference on Wireless and Mobile Computing, Networking and Communications (WiMob'16), Workshop on e-Health Pervasive Wireless Applications and Services*, eHPWAS'16 (2016).

Xinlei Wang, Jianqing Zhang, Eve M. Schooler, Mihaela Ion, "Performance Evaluation of Attribute-based Encryption: Toward Privacy in the IoT", *IEEE International Conference on Communications*, ICC'14, pp. 725-730, Sydney, Australia (Aug 2014).

Mihaela Ion, Jianqing Zhang, Eve M. Schooler, "Toward Content-Centric Privacy in ICN: Attribute-based Encryption and Routing", *ACM SIGCOMM'13 and SIGCOMM ICN'13 Workshop*, extended abstract, Hong Kong (Aug 2013).

Jianqing Zhang, Qinghua Li, Eve M. Schooler, "iHEMS: An Information-Centric Approach to Secure Home Energy Management", *IEEE 3<sup>rd</sup> International Conference on Smart Grid Communications, SmartGridComm'12*, pp.217-222, Tainan City, Taiwan (Nov 2012).

David Zage, Carl Livadas, Eve Schooler, "A Network-Aware Distributed Membership Protocol for Collaborative Defense", 12<sup>th</sup> IEEE International Conference on Computational Science and Engineering (CSE'09), *Workshop on Leveraging Social Patterns for Security, Privacy and Networks SP4SPNA'09*, pp.1123-1130 (August 2009).

Frederic Giroire, Jaideep Chandrashekar, Nina Taft, Eve M. Schooler, Dina Papagiannaki, "Exploiting Temporal Persistence to Detect Covert Botnet Channels", *Recent Advances in Intrusion Detection, RAID'09*, pp.326-345 (Sept 2009).

F. Giroire, J. Chandrashekar, G. Iannaccone, K. Papagiannaki, E. Schooler and N. Taft, "The Cubicle vs. The Coffee Shop: Behavioral Modes in Enterprise End-Users", *Proceedings Passive and Active Measurement Workshop, PAM'08*, pp.202-211 (April 2008).

Sentil Cheetancheri, John-Mark Agosta, Jaideep Chandrashekar, Denver Dash, Karl Levitt, Jeff Rowe, Eve Schooler, "A Distributed Host-based Worm Detection System", *ACM SIGCOMM, Proceedings Workshop on Large Scale Attack Defense, LSAD'06* (Sept 2006).

Denver Dash, Branislav Kveton, John Mark Agosta, Eve Schooler, Jaideep Chandrashekar, Abraham Bachrach, Alex Newman, "When Gossip is Good: Distributed Probabilistic Inference for Detection of Slow Network Intrusions", *Proceedings Twenty-First National Conference on Artificial Intelligence, AAAI'06*, pp. 1115-1122 (July 2006).

Denver Dash, John Mark Agosta, Jaideep Chandrashekar, Eve Schooler, "Detecting weak network anomalies with Bayesian models", *Twenty-Third International Conference on Machine Learning, ICML'06, Workshop on Machine Learning Algorithms for Surveillance and Event Detection* (June 2006).

J.M. Agosta, A. Bachrach, D. Dash, B. Kveton, A. Newman, E. Schooler, "Distributed Detection and Inference in Enterprise Networks", *Proceedings Intelligence Beyond The Desktop Workshop, NIPS'05* (Dec 2005).

Denver Dash, John Mark Agosta, Abraham Bachrach, Branislav Kveton, Alex Newman, Eve Schooler, "Learning robust generative models for distributed anomaly detection", *Proceedings Intelligence Beyond the Desktop Workshop, NIPS'05* (Dec 2005).

J.M. Agosta, A. Bachrach, D. Dash, B. Kveton, A. Newman, E. Schooler, "Distributed Inference to Detect a Network Attack", *Proceedings 4th Adaptive and Resilient Computing Security Workshop, ARCS'05*, Santa Fe, NM (Nov 2005).

D. Dash, J.M. Agosta, E. Schooler, B. Kveton, "Population-based Modeling for Distributed Detection of Network Anomalies", *Proceedings Intel Research Conference, IRCON'05*, Portland, OR (Aug 2005).

Chesterfield, J., Schooler, E.M., "An Extensible RTCP Control Framework for Large Multimedia Distributions", *Proceedings the 2<sup>nd</sup> IEEE International Symposium on Network Computing and Applications, NCA'03*, Cambridge, MA (Apr 2003); a longer version appeared as Technical Report, AT&T Labs-Research, Menlo Park, CA (Jan 2003).

Gemmell, J., Schooler, E., Gray, J., "Fcast Multicast File Distribution: Tune in, Download, and Drop out", *Proceedings of the IASTED International Conference on Internet and Multimedia Systems and Applications, IMSA'99*, Nassau, Bahamas, pp.371-377 (Oct 1999).

Chandy, M., Ginis, R., Schooler, E., "A General Distributed Event Model", *Proceedings of the IEEE Fifth International Conference on High Performance Computing, HiPC'98*, pp.119-123, Madras, India (Dec 1998).  
Gemmell, J., Schooler, E., Kermod, R., "A Scalable Multicast Architecture for One-to-Many Telepresentations", *Proceedings of the IEEE International Conference on Multimedia Computing Systems, ICMCS'98*, Austin, TX, pp. 128-139 (Jun 1998).

Chandy, K.M., Schooler, E.M., "Designing Directories in Distributed Systems: A Systematic Framework", *Proceedings of the Workshop on Multimedia and Collaborative Environments, High Performance Distributed Computing Conference*, Syracuse, NY, pp. 318-328 (Aug 1996); also available as technical report CS-TR-96-19, Department of Computer Science, Caltech, Pasadena, CA (Aug 1996).

Shenker, S., Weinrib, A., Schooler, E.M., "Managing Shared Ephemeral State: Policy and Mechanism", *Proceedings International Workshop on Multimedia Transport and Teleservices, COST237*, Vienna, Austria (Nov 1994); republished as *Springer-Verlag Lecture Notes in Computer Science*, Vol. 882, pp. 69-88 (1994); a later version appears as Internet Draft "ietf-mmusic-agree-00.txt", IETF MMusic Working Group.

Schooler, E.M., "Abstractions for Packet Teleconferencing: A Wide-Area Distributed Multimedia Application", panel member, Abstractions for Coordination and Control session, extended abstract in *Proceedings of the Workshop on Programming Abstractions for Distributed Multimedia Applications, ACM Multimedia '93*, Anaheim, CA, MM'93 (Aug 1993).

Schooler, E.M., Casner, S.L., Postel, J., "Multimedia Conferencing: Has it come of age?", *invited paper*, Collaboratory Projects Panel, *Proceedings of the 24th Hawaii International Conference on Systems Sciences*, Vol.3, pp.707-716, HICSS'91 (Jan 1991); Technical Report ISI/RS-91-286, USC/ISI, Marina del Rey, CA (Aug 1991).

Schooler, E.M., "Telecollaboration: Conferencing From Afar", panel member, Collaborative Design Session, extended abstract in *Proceedings of the International Conference on Systems, Man and Cybernetics*, Universal City, CA (Nov 1990).

Schooler, E.M., Casner, S.L., "Multimedia Conferencing in the Internet: the Effect of Long Distances on Groupware Design", *Proceedings of the Groupware Technology Workshop*, IFIP Working Group 8.4, Palo Alto, CA (Aug 1989).

#### **Technical Reports and Other Manuscripts:**

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