



Philip Levis

Professor of Computer Science and of Electrical Engineering

CONTACT INFORMATION

- **Administrator**

Ann Harara - Administrative Associate

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Bio

BIO

Professor Levis' research focuses on the design and implementation of efficient software systems for embedded wireless sensor networks; embedded network sensor architecture and design; systems programming and software engineering.

ACADEMIC APPOINTMENTS

- Professor, Computer Science
- Professor, Electrical Engineering
- Affiliate, Precourt Institute for Energy

HONORS AND AWARDS

- Faculty Fellow, Microsoft (2008)
- CAREER Award, NSF (2009)
- Okawa Research Grant, Okawa Foundation (2013)
- PLDI Test of Time Award, ACM (2013)
- NSDI Test of Time Award, ACM (2014)
- SIGMOBILE Test of Time Award, ACM (2021)
- SenSys Test of Time Award, ACM (2022)

PROFESSIONAL EDUCATION

- Sc.B., Brown University , Biology and Computer Science (1999)
- M.S., CU Boulder , Computer Science (2001)
- Ph.D., UC Berkeley , Computer Science (2005)

Teaching

COURSES

2024-25

- An Intro to Making: What is EE: ENGR 40M (Spr)
- Embedded Systems Workshop: CS 241, EE 285 (Aut)

2023-24

- Advanced Topics in Networking: CS 244 (Spr)
- An Intro to Making: What is EE: ENGR 40M (Aut)
- Embedded Systems Workshop: CS 241, EE 285 (Win)
- Rusty Systems: CS 340R (Spr)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Dillon Jensen, Kevli Li, Gedeon Nyengele, Grant Wilkins, Zhiqiang Xie

Doctoral Dissertation Advisor (AC)

Agur Adams, Obi Nnorom Jr, David Shim

Orals Evaluator

Zhiqiang Xie

Master's Program Advisor

Sebastian Fisher, Arnav Gupta, Jerry Li, Frances Raphael, Janina Troper, Angela Wei, Lin Yuan

Doctoral Dissertation Co-Advisor (AC)

Evan Laufer

Doctoral (Program)

Muhammad Abdurrahman, Agur Adams, Levy Deng, Anna Eaton, Daniel Mendoza, Obi Nnorom Jr, David Shim, Maxwell Strange

Publications

PUBLICATIONS

- **GRIP: A Graph Neural Network Accelerator Architecture** *IEEE TRANSACTIONS ON COMPUTERS*
Kinningham, K., Levis, P., Re, C.
2023; 72 (4): 914-925
- **Cornflakes: Zero-Copy Serialization for Microsecond-Scale Networking**
Raghavan, D., Ravi, S., Yuan, G., Thaker, P., Srivastava, S., Murray, M., Penna, P., Ousterhout, A., Levis, P., Zaharia, M., Zhang, I., ACM
ASSOC COMPUTING MACHINERY.2023: 200-215
- **Towards Retina-Quality VR Video Streaming: 15 ms Could Save You 80% of Your Bandwidth** *ACM SIGCOMM COMPUTER COMMUNICATION REVIEW*
Hsiao, L., Krajancich, B., Levis, P., Wetzstein, G., Winstein, K.
2022; 52 (1): 11-19
- **Poster Abstract: Software Defined Battery-Solar Systems**
Martin, S., Nnorom, O., Triebe, O., Patel, L., Levis, P., Rajagopal, R., ACM
ASSOC COMPUTING MACHINERY.2022: 291-292

- **Software defined grid energy storage** *9th ACM International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation*
Martin, S., Mosier, N., Nnorom, O., Ou, Y., Patel, L., Triebe, O., Cezar, G., Levis, P., Rajagopal, R.
2022: 10
- **Tighten rust's belt: shrinking embedded Rust binaries** *23rd ACM SIGPLAN/SIGBED International Conference on Languages, Compilers, and Tools for Embedded Systems*
Ayers, H., Laufer, E., Mure, P., Park, J., Rodelo, E., Rossman, T., Pronin, A., Levis, P., Van Why, J.
2022: 12
- **Tiered Trust for Useful Embedded Systems Security**
Ayers, H., Dutta, P., Levis, P., Levy, A., Pannuto, P., Van Why, J., Watson, J., ACM
ASSOC COMPUTING MACHINERY.2022: 15-21
- **Clamor: Extending Functional Cluster Computing Frameworks with Fine-Grained Remote Memory Access**
Thaker, P., Ayers, H., Raghavan, D., Niu, N., Levis, P., Zaharia, M., ACM
ASSOC COMPUTING MACHINERY.2021: 654-669
- **Receiving Colliding LoRa Packets with Hard Information Iterative Decoding**
Jung, R., Levis, P., IEEE
IEEE.2021
- **Creating Hardware Component Knowledge Bases with Training Data Generation and Multi-task Learning** *ACM TRANSACTIONS ON EMBEDDED COMPUTING SYSTEMS*
Hsiao, L., Wu, S., Chiang, N., Re, C., Levis, P.
2020; 19 (6)
- **Accelerating Distributed Graphical Fluid Simulations with Micro-partitioning** *COMPUTER GRAPHICS FORUM*
Qu, H., Mashayekhi, O., Shah, C., Levis, P.
2020; 39 (1): 375–88
- **Learning in situ: a randomized experiment in video streaming**
Yan, F. Y., Ayers, H., Zhu, C., Fouladi, S., Hong, J., Zhang, K., Levis, P., Winstein, K., USENIX Assoc
USENIX ASSOC.2020: 495–511
- **POSH: A Data-Aware Shell**
Raghavan, D., Fouladi, S., Levis, P., Zaharia, M., USENIX Assoc
USENIX ASSOC.2020: 617-631
- **Design Considerations for Low Power Internet Protocols**
Ayers, H., Crews, P., Teo, H., McAvity, C., Levy, A., Levis, P., IEEE
IEEE COMPUTER SOC.2020: 103–11
- **Unsupervised Large-Scale Search for Similar Earthquake Signals** *BULLETIN OF THE SEISMOLOGICAL SOCIETY OF AMERICA*
Yoon, C. E., Bergen, K. J., Rong, K., Elezabi, H., Ellsworth, W. L., Beroza, G. C., Bailis, P., Levis, P.
2019; 109 (4): 1451–68
- **Falcon — A Flexible Architecture For Accelerating Cryptography** *2019 IEEE 16th International Conference on Mobile Ad Hoc and Sensor Systems (MASS)*
Kinningham, K., Levis, P., Anderson, M., Boneh, D., Horowitz, M., Shih, M.
2019
- **Challenge: Unlicensed LPWANs Are Not Yet the Path to Ubiquitous Connectivity**
Ghena, B., Adkins, J., Shangguan, L., Jamieson, K., Levis, P., Dutta, P., Assoc Com Machinery
ASSOC COMPUTING MACHINERY.2019
- **Automatically Distributing Eulerian and Hybrid Fluid Simulations in the Cloud** *ACM TRANSACTIONS ON GRAPHICS*
Mashayekhi, O., Shah, C., Qu, H., Lim, A., Levis, P.
2018; 37 (2)
- **Locality-Sensitive Hashing for Earthquake Detection: A Case Study of Scaling Data-Driven Science** *PROCEEDINGS OF THE VLDB ENDOWMENT*

-
- Rong, K., Yoon, C. E., Bergen, K. J., Elezabi, H., Bailis, P., Levis, P., Beroza, G. C.
2018; 11 (11): 1674–87
- **Fonduer: Knowledge Base Construction from Richly Formatted Data.** *Proceedings. ACM-Sigmod International Conference on Management of Data*
Wu, S., Hsiao, L., Cheng, X., Hancock, B., Rekatsinas, T., Levis, P., Re, C.
2018; 2018: 1301–16
 - **Poster Abstract: Design Considerations for Low Power Internet Protocols**
Ayers, H., Crews, P., Teo, H., McAvity, C., Levy, A., Levis, P., Assoc Comp Machinery
ASSOC COMPUTING MACHINERY.2018: 317–18
 - **Smart Contracts for Machine-to-Machine Communication: Possibilities and Limitations**
Hanada, Y., Hsiao, L., Levis, P., IEEE
IEEE.2018: 130–36
 - **Decoupling the Control Plane from Program Control Flow for Flexibility and Performance in Cloud Computing**
Qu, H., Mashayekhi, O., Shah, C., Levis, P., Assoc Comp Machinery
ASSOC COMPUTING MACHINERY.2018
 - **Poster Abstract: Dynamic Multi-Clock Management for Embedded Systems**
Chiang, H., Giffin, D., Levy, A., Levis, P., Assoc Comp Machinery
ASSOC COMPUTING MACHINERY.2018: 347–48
 - **Execution Templates: Caching Control Plane Decisions for Strong Scaling of Data Analytics**
Mashayekhi, O., Qu, H., Shah, C., Levis, P., USENIX Assoc
USENIX ASSOC.2017: 513–26
 - **The Case for Writing a Kernel in Rust**
Levy, A., Campbell, B., Ghena, B., Pannuto, P., Dutta, P., Levis, P., ACM
ASSOC COMPUTING MACHINERY.2017
 - **Ebb: A DSL for Physical Simulation on CPUs and GPUs** *ACM TRANSACTIONS ON GRAPHICS*
Bernstein, G. L., Shah, C., Lemire, C., Devito, Z., Fisher, M., Levis, P., Hanrahan, P.
2016; 35 (2)
 - **Deflating link buffers in a wireless mesh network** *AD HOC NETWORKS*
Jamshaid, K., Shihada, B., Showail, A., Levis, P.
2014; 16: 266-280
 - **Applications of Self-Interference Cancellation in 5G and Beyond** *IEEE COMMUNICATIONS MAGAZINE*
Hong, S., Brand, J., Il Choi, J., Jain, M., Mehlman, J., Katti, S., Levis, P.
2014; 52 (2): 114-121
 - **CTP: An Efficient, Robust, and Reliable Collection Tree Protocol for Wireless Sensor Networks.** *In ACM Transactions on Sensor Networks (TOSN)*
Gnawali, O., Fonseca, R., Jamieson, K., Kazandjieva, M., Moss, D., Levis, P.
2014
 - **CTP: An Efficient, Robust, and Reliable Collection Tree Protocol for Wireless Sensor Networks** *ACM TRANSACTIONS ON SENSOR NETWORKS*
Gnawali, O., Fonseca, R., Jamieson, K., Kazandjieva, M., Moss, D., Levis, P.
2013; 10 (1)
 - **Measuring and analyzing the energy use of enterprise computing systems** *SUSTAINABLE COMPUTING-INFORMATICS & SYSTEMS*
Kazandjieva, M., Heller, B., Gnawali, O., Levis, P., Kozyrakis, C.
2013; 3 (3): 218-229
 - **Long-term modification of cortical synapses improves sensory perception** *NATURE NEUROSCIENCE*
Froemke, R. C., Carcea, I., Barker, A. J., Yuan, K., Seybold, B. A., Martins, A. R., Zaika, N., Bernstein, H., Wachs, M., Levis, P. A., Polley, D. B., Merzenich, M. M., Schreiner, et al

2013; 16 (1): 79-U120

- **Measuring and Analyzing the Energy Use of Enterprise Computing Systems.** *In Journal of Sustainable Computing*
Kazandjieva, M., Gnawali, O., Levis, P., Kozyrakis, C.
2013
- **Green Enterprise Computing Data: Assumptions and Realities** *3rd International Green Computing Conference (IGCC)*
Kazandjieva, M., Heller, B., Gnawali, O., Levis, P., Kozyrakis, C.
IEEE.2012
- **A Scalable Server for 3D Metaverses.**
Cheslack-Postava, E., Azim, T., Mistree, B., Horn, D., Terrace, J., Levis, P.
2012
- **RFC 6719 - The Minimum Rank with Hysteresis Objective Function.** *In Internet Engineering Task Force (IETF), Request for Comments: 6719*
Gnawali, O., Levis, P.
2012
- **Unsupervised Conversion of 3D models for Interactive Metaverses.**
Terrace, J., Cheslack-Postava, E., Levis, P., Freedman, M.
2012
- **Experiences from a Decade of TinyOS Development.**
Levis, P.
2012
- **Beyond Full Duplex Wireless** *46th Asilomar Conference on Signals, Systems and Computers*
Choi, J. I., Hong, S., Jain, M., Katti, S., Levis, P., Mehlman, J.
IEEE.2012: 40–44
- **Connecting Low-Power and Lossy Networks to the Internet** *IEEE COMMUNICATIONS MAGAZINE*
Ko, J., Terzis, A., Dawson-Haggerty, S., Culler, D. E., Hui, J. W., Levis, P.
2011; 49 (4): 96-101
- **Measuring school contact networks using wireless sensor technology**
Jones, J. H., Salathe, M., Feldman, M. W., KAZANDJIEVA, M., Lee, J. W., Levis, P.
WILEY-BLACKWELL.2011: 263–63
- **Energy Management in Mobile Devices with the Cinder Operating System** *6th ACM EuroSys Conference on Computer Systems (EuroSys 2011)*
Roy, A., Rumble, S. M., Stutsman, R., Levis, P., Mazieres, D., Zeldovich, N.
ASSOC COMPUTING MACHINERY.2011: 139–152
- **Emerson: Accessible Scripting for Applications in an Extensible Virtual World.**
Mistree, B., Chandra, B., Cheslack-Potava, E., Levis, P., Gay, D.
2011
- **Practical, Real-time, Full-Duplex Wireless.**
Jain, M., Choi, J. I., Kim, T., Bharadia, D., Seth, S., Srinivasan, K., Levis, P. A.
2011
- **Buffer Sizing in Wireless Mesh Networks.**
Jamshaid, K., Shihada, B., Xia, L., Levis, P.
2011
- **A high-resolution human contact network for infectious disease transmission** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
Salathe, M., Kazandjieva, M., Lee, J. W., Levis, P., Feldman, M. W., Jones, J. H.
2010; 107 (51): 22020-22025
- **Physically-based models of low-power wireless links using signal power simulation** *COMPUTER NETWORKS*
Rusak, T., Levis, P.

2010; 54 (4): 658-673

- **An Empirical Study of Low-Power Wireless** *ACM TRANSACTIONS ON SENSOR NETWORKS*
Srinivasan, K., Dutta, P., Tavakoli, A., Levis, P.
2010; 6 (2)
- **Apprehending Joule Thieves with Cinder** *COMPUTER COMMUNICATION REVIEW*
Rumble, S. M., Stutsman, R., Levis, P., Mazieres, D., Zeldovich, N.
2010; 40 (1): 106-111
- **Achieving Single Channel, Full Duplex Wireless Communication** *16th Annual International Conference on Mobile Computing and Networking / 11th ACM International Symposium on Mobile Ad Hoc Networking and Computing (MobiCom/MobiHoc)*
Choi, J. I., Jain, M., Srinivasan, K., Levis, P., Katti, S.
ASSOC COMPUTING MACHINERY.2010: 1–12
- **The kappa Factor: Inferring Protocol Performance Using Inter-link Reception Correlation** *16th Annual International Conference on Mobile Computing and Networking / 11th ACM International Symposium on Mobile Ad Hoc Networking and Computing (MobiCom/MobiHoc)*
Srinivasan, K., Jain, M., Cho, J. I., Azim, T., Kim, E. S., Levis, P., Krishnamachari, B.
ASSOC COMPUTING MACHINERY.2010: 317–328
- **Achieving Single Channel, Full Duplex Wireless Communication.**
Choi, J. I., Jain, M., Srinivasan, K., Levis, P., Katti, S.
2010
- **Emerson: Scripting for Federated Virtual Worlds.**
Chandra, B., Cheslack-Postava, E., Mistree, B., Levis, P., Gay, D.
2010
- **Experiences in Measuring a Human Contact Network for Epidemiology Research.**
Kazandjieva, M., Lee, J. W., Salathe, M., Feldman, M. W., Jones, J. H., Levis, P.
2010
- **A Case for Evaluating Sensor Network Protocols Concurrently.**
Gnawali, O., Guibas, L., Levis, P.
2010
- **Granting Silence to Avoid Wireless Collisions.**
Choi, J. I., Jain, M., Kazandjieva, M. A., Levis, P.
2010
- **Whirlpool Routing for Mobility.**
Lee, J. W., Kusy, B., Azim, T., Levis, P., Shihada, B.
2010
- **The k-factor: Inferring Protocol Performance Using Inter-Link Reception Correlation.**
Srinivasan, K., Jain, M., Choi, J. I., Azim, T., Kim, E. S., Levis, P.
2010
- **Scaling Virtual Worlds with a Physical Metaphor** *IEEE PERVASIVE COMPUTING*
Horn, D., Cheslack-Postava, E., Azim, T., Freedman, M. J., Levis, P.
2009; 8 (3): 50-54
- **Surviving Sensor Network Software Faults** *22nd ACM SIGOPS Symposium on Operating Systems Principles*
Chen, Y., Gnawali, O., Kazandjieva, M., Levis, P., Regehr, J.
ASSOC COMPUTING MACHINERY.2009: 235–246
- **The Case for a Network Protocol Isolation Layer** *7th ACM Conference on Embedded Networked Sensor Systems (SENSYS)*
Choi, J. I., Kazandjieva, M. A., Jain, M., Levis, P.
ASSOC COMPUTING MACHINERY.2009: 267–280
- **Collection Tree Protocol** *7th ACM Conference on Embedded Networked Sensor Systems (SENSYS)*

-
- Gnawali, O., Fonseca, R., Jamieson, K., Moss, D., Levis, P.
ASSOC COMPUTING MACHINERY.2009: 1–14
- **Energy Dumpster Diving.** *In Second Workshop on Power Aware Computing (HotPower)*
Kazandjieva, M., Heller, B., Levis, P., Kozyrakis, C.
2009
 - **Burstiness and scaling in the structure of low-power wireless links.** *In ACM SIGMOBILE Mobile Computing and Communications Review*
Rusak, T., Levis, P.
2009
 - **TOSThreads: Thread-safe and Non-invasive Preemption in TinyOS** *7th ACM Conference on Embedded Networked Sensor Systems (SENSYS)*
Klues, K., Liang, C. M., Paek, J., Musaloiu-E, R., Levis, P., Terzis, A., Govindan, R.
ASSOC COMPUTING MACHINERY.2009: 127–140
 - **The Case for a Network Protocol Isolation Layer.**
Choi, J. I., Kazandjieva, M., Jain, M., Levis, P.
2009
 - **TOSThreads: Thread-Safe and Non-Invasive Preemption in TinyOS.**
Klues, K., Liang, C. M., Paek, J., Razvan, M., Levis, P., Terzis, A.
2009
 - **Collection Tree Protocol.**
Gnawali, O., Fonseca, R., Jamieson, K., Moss, D., Levis, P.
2009
 - **SWAT: Know Your Network** *8th International Symposium on Information Processing Sensor Networks*
Srinivasan, K., Kazandjieva, M. A., Jain, M., Kim, E., Levis, P.
IEEE.2009: 431–432
 - **Starburst SSD: An Efficient Protocol for Selective Dissemination** *IEEE International Conference on Communications (ICC 2009)*
Azim, T., Mansoor, Q., Levis, P.
IEEE.2009: 74–79
 - **Apprehending Joule Thieves with Cinder** *1st ACM Workshop on Networking, Systems, and Applications for Mobile Handhelds*
Rumble, S. M., Stutsman, R., Levis, P., Mazieres, D., Zeldovich, N.
ASSOC COMPUTING MACHINERY.2009: 49–54
 - **Mesh networking - Research and technology for multihop wireless networks** *IEEE INTERNET COMPUTING*
Madden, S., Levis, P.
2008; 12 (4): 9-11
 - **The emergence of a networking primitive in wireless sensor networks** *COMMUNICATIONS OF THE ACM*
Levis, P., Brewer, E., Culler, D., Gay, D., Madden, S., Patel, N., Polastre, J., Shenker, S., Szewczyk, R., Woo, A.
2008; 51 (7): 99-106
 - **Investigating a Physically-Based Signal Power Model for Robust Low Power Wireless Link Simulation** *11th ACM International Conference on Modeling, Analysis and Simulation of Wireless and Mobile Systems*
Rusak, T., Levis, P.
ASSOC COMPUTING MACHINERY.2008: 37–46
 - **Quanto: Tracking Energy in Networked Embedded Systems.**
Fonseca, R., Dutta, P., Levis, P., Stoica, I.
2008
 - **SWAT: Enabling Wireless Network Measurements** *6th ACM Conference on Embedded Networked Sensor Systems*
Srinivasan, K., Kazandjieva, M. A., Jain, M., Kim, E., Levis, P.
ASSOC COMPUTING MACHINERY.2008: 395–396

- **The beta-factor: Measuring Wireless Link Burstiness** *6th ACM Conference on Embedded Networked Sensor Systems*
Srinivasan, K., Kazandjieva, M. A., Agarwal, S., Levis, P.
ASSOC COMPUTING MACHINERY.2008: 29–41
- **Data discovery and dissemination with DIP** *7th International Symposium on Information Processing Sensor Networks*
Lin, K., Levis, P.
IEEE COMPUTER SOC.2008: 433–444
- **On the Scaling Properties of Low Power Wireless Links** *6th ACM Conference on Embedded Networked Sensor Systems*
Rusak, T., Levis, P.
ASSOC COMPUTING MACHINERY.2008: 441–442
- **Software design patterns for TinyOS** *Conference on Languages, Compilers and Tools for Embedded Systems*
Gay, D., Levis, P., Culler, D.
ASSOC COMPUTING MACHINERY.2007
- **Four-Bit Wireless Link Estimation.**
Fonseca, R., Gnawali, O., Jamieson, K., Levis, P.
2007
- **Integrating Concurrency Control and Energy Management in Device Drivers.**
Klues, K., Handziski, V., Lu, C., Wolisz, A., Culler, D., Gay, D., Levis, P. A.
2007
- **Opening the Sensornet Black Box.**
Choi, J. I., Lee, J. W., Wachs, M., Levis, P.
2007
- **Flush: A Reliable Bulk Transport Protocol for Multihop Wireless Networks** *5th ACM Conference on Embedded Networked Sensor Systems*
Kim, S., Fonseca, R., Dutta, P., Tavakoli, A., Culler, D., Levis, P., Shenker, S., Stoica, I.
ASSOC COMPUTING MACHINERY.2007: 351–365
- **Visibility: A New Metric For Protocol Design** *5th ACM Conference on Embedded Networked Sensor Systems*
Wachs, M., Il Choi, J., Lee, J. W., Srinivasan, K., Chen, Z., Jain, M., Levis, P.
ASSOC COMPUTING MACHINERY.2007: 73–86
- **The Design and Implementation of a Declarative Sensor Network System** *5th ACM Conference on Embedded Networked Sensor Systems*
Chu, D., Popa, L., Tavakoli, A., Hellerstein, J. M., Levis, P., Shenker, S., Stoica, I.
ASSOC COMPUTING MACHINERY.2007: 175–188
- **Improving wireless simulation through noise modeling** *6th International Symposium on Information Processing Sensor Networks*
Lee, H., Cerpa, A., Levis, P.
ASSOC COMPUTING MACHINERY.2007: 21–30
- **Interface contracts for TinyOS** *6th International Symposium on Information Processing Sensor Networks*
Archer, W., Levis, P., Regehr, J.
ASSOC COMPUTING MACHINERY.2007: 158–165
- **Fair Waiting Protocol: Achieving Isolation in Wireless Sensornets** *5th ACM Conference on Embedded Networked Sensor Systems*
Il Choi, J., Lee, J. W., Chen, Z., Levis, P.
ASSOC COMPUTING MACHINERY.2007: 411–412
- **RSSI Is Under-Appreciated.**
Srinivasan, K., Levis, P.
2006
- **Some Implications of Low-Power Wireless to IP Routing.**
Srinivasan, K., Dutta, P., Tavakoli, A., Levis, P.
2006

- **Software design patterns for TinyOS** *Conference on Languages, Compilers and Tools for Embedded Systems*
Gay, D., Levis, P., Culler, D.
ASSOC COMPUTING MACHINERY.2005: 40–49
- **Active sensor networks** *2nd Symposium on Networked Systems Design and Implementation (NSDI 05)*
Levis, P., Gay, D., Culler, D.
USENIX ASSOC.2005: 343–356
- **A Unifying Link Abstraction for Wireless Sensor Networks.**
Polastre, J., Hui, J., Levis, P., Zhao, J., Culler, D., Shenker, S.
2005
- **Towards a Sensor Network Architecture: Lowering the Waistline.**
Culler, D., Dutta, P., Eee, C. T., Fonseca, R., Hui, J., Levis, P.
2005
- **Trickle: A self-regulating algorithm for code propagation and maintenance in wireless sensor networks** *1st Symposium on Networked Systems Design and Implementation*
Levis, P., Patel, N., Culler, D., Shenker, S.
USENIX ASSOC.2004: 15–28
- **The Firecracker Protocol.**
Levis, P., Culler, D.
2004
- **The emergence of networking abstractions and techniques in TinyOS** *1st Symposium on Networked Systems Design and Implementation*
Levis, P., Madden, S., Gay, D., Polastre, J., Szewczyk, R., Woo, A., Brewer, E., Culler, D.
USENIX ASSOC.2004: 1–14
- **The nesC language: A holistic approach to networked embedded systems** *Conference on Programming Language Design and Implementation*
Gay, D., Levis, P., von Behren, R., Welsh, M., Brewer, E., Culler, D.
ASSOC COMPUTING MACHINERY.2003: 1–11
- **TOSSIM: Accurate and Scalable Simulation of Entire TinyOS Applications.**
Levis, P., Lee, N., Welsh, M., Culler, D.
2003
- **Mate: A tiny virtual machine for sensor networks** *ACM SIGPLAN NOTICES*
Levis, P., Culler, D.
2002; 37 (10): 85-95
- **Mate: A Tiny Virtual Machine for Sensor Networks.**
Levis, P., Culler, D.
2002
- **Policies for Dynamic Clock Scheduling.**
Grunwald, D., Levis, P., Morrey III, Charles, B., Neufeld, M.
2000