Michael J. Freedman

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Academics

Princeton University ..... Princeton, NJ

Robert E. Kahn Professor of Computer Science ..... July 2021 – onward

Professor of Computer Science ..... Sept 2015 – June 2021

Associate Professor (with tenure) of Computer Science ..... July 2013 – Aug 2015

Assistant Professor of Computer Science ..... Sept 2007 – June 2013

New York University, Courant Institute ..... New York, NY

Ph.D. in Computer Science ..... Sept 2007
Thesis title: *Democratizing Content Distribution*
Visited **Stanford University** to accompany advisor, Sept 2005 – Aug 2007
Advisor: David Mazières ; GPA: 4.0/4.0

M.S. in Computer Science ..... May 2005
Advisor: David Mazières ; GPA: 4.0/4.0

Massachusetts Institute of Technology ..... Cambridge, MA

M.Eng. in Electrical Engineering and Computer Science ..... June 2002
Thesis title: *A Peer-to-Peer Anonymizing Network Layer*
Advisor: Robert Morris ; GPA: 5.0/5.0

S.B. in Computer Science, Minor in Political Science ..... June 2001
Thesis title: *An Anonymous Communications Channel for the Free Haven Project*
Advisor: Ron Rivest ; GPA: 4.9/5.0

Wyoming Valley West High School ..... Plymouth, PA

Class Valedictorian (1 / 314), June 1997. National Merit Finalist, A.P. Scholar with Distinction

Interests

Distributed systems, networking, and security.

Work experience

7/21–present	**Princeton University**, Robert E. Kahn Professor of Computer Science, Princeton, NJ.
4/17–present	**Timescale**, Co-Founder & CTO, New York, NY. Timescale builds an open-source relational database and cloud platform for time-series data. Raised over $180M from top VCs (Benchmark, New Enterprise Associates, Redpoint Ventures, Tiger Global, Icon Ventures, Two Sigma Ventures).
9/15–6/21	**Princeton University**, Professor, Princeton, NJ.
7/13–8/15	**Princeton University**, Associate Professor (with tenure), Princeton, NJ.
8/07–6/13	**Princeton University**, Assistant Professor, Princeton, NJ.
3/06–11/06	**Illuminics Systems**, Co-founder, Mountain View, CA. Acquired by Quova, Inc.
9/05–8/07	**Stanford University** (SCS Group), Research Staff, Stanford, CA.

5/05–8/05 **University of California, Berkeley**, Research Assistant, Berkeley, CA.

9/02–5/05 **New York University** (SCS Group), Research Assistant, New York, NY.

5/03–8/03 **HP Labs** (Trusted Systems Lab), Research Associate, Princeton, NJ.

9/01–6/02 **MIT Lab for Computer Science** (PDOS Group), Research Assistant, Cambridge, MA.

5/01–8/01 **InterTrust Technologies** (STAR Lab), Research Intern, Santa Clara, CA.

6/00–8/00 **Zero-Knowledge Systems**, Advanced R&D Intern, Montreal, Quebec.

6/99–8/99 **Sun Microsystems** (HPC Group), Software Development Intern, Burlington, MA.

6/98–8/98 **Cognex Corporation**, Software Development Intern, Natick, MA.

9/96–5/97 **System Administrator.** Wilkes University (Simulation Lab), Wilkes-Barre, PA.

6/95–8/95 **Intern.** Michigan State University (HPC Group), East Lansing, MI.

Honors

Faculty Awards

- **ACM SIGOPS Mark Weiser Award, 2021** ("given to an individual who has demonstrated creativity and innovation in operating systems research, broadly construed")
- **ACM Fellow, 2019** ("for contributions to robust distributed systems for the modern cloud")
- **ACM Grace Murray Hopper Award, 2018** ("for the design and deployment of self-organizing geo-distributed systems")
- Princeton Engineering Commendation List for Outstanding Teaching, 2012
- **Presidential Early Career Award for Scientists and Engineers (PECASE)**, awarded by President Obama, 2011 (one of 20 nominated by NSF, 96 across all government agencies)
- DARPA Computer Science Study Group (CSSG) member, 2011 (13 early-career faculty chosen across computer science)
- Alfred P. Sloan Research Fellowship, 2011 (126 across sciences)
- CAREER Award (CSR), National Science Foundation, 2009
- Young Investigator Award, Office of Naval Research, 2009 (15 from science/engineering)
- E. Lawrence Keyes, Jr./Emerson Electric Co. Faculty Advancement Award, Princeton School of Engineering and Applied Science (SEAS), 2009

Publication Awards

- Test of Time Award (for Oblivious Pseudorandom Functions), Theory of Cryptography Conference 2021 [58]
- ACM SIGPLAN Most Influential Paper of ICFP11 (10 Year Test of Time for Frenetic), 2021 [40]
- Best Paper, ACM/IFIP International Middleware Conference 2019 [4]
- Best Paper, ACM Symposium on Cloud Computing 2017 [7]
- Test of Time Award (for software-defined networking), ACM SIGCOMM 2017 [51]
- Caspar Bowden Award for Outstanding Research in Privacy Enhancing Technologies, 2017 [14]
- Best Paper, USENIX Annual Technical Conference 2016 [11]
- Finalist, BigApps NYC 2015 [195]
- Spotlight Paper, NIPS 2012 [28]
- Best Student Paper, USENIX Security 2012 [31]
- Selected papers (2 of 6 invited to ACM SIGOPS OSR special issue), LADIS 2012 [106] [107]
- IETF/IRTF Applied Networking Research Prize, Finalist, 2012 [34]
- Community Award, Honorable Mention, NSDI 2012 [34]

- Award paper (invited to ACM SIGOPS OSR special issue), LADIS 2011 [70]
- Highest-ranked paper (fast-tracked to IEEE/ACM ToN), SIGCOMM 2007 [51]
- Best demo award, WORLDS 2005 [54]
- Highest-ranked paper, EUROCRYPT 2004 [60]
- Award paper (invited to ACM TISSEC), CCS 2002 [63]

Doctoral Awards

- Nominated by NYU for ACM Doctoral Dissertation award, 2008
- Janet Fabri Prize, NYU Computer Science, 2008 (best Ph.D. dissertation)
- Henning Biermann Award, NYU Comp. Sci., 2005 (outstanding education and service)
- NDSEG (DoD) Graduate Fellow, 2002-2005
- NYU McCracken Fellow, 2002-2006
- Other awarded graduate fellowships: National Science Foundation (2002-2005); Gordon Wu Fellowship, Princeton (2001); Sterling Prize Fellowship, Yale (2001); Graduate Fellowships, U.C. Berkeley, Carnegie-Mellon, UCSD (2001)

Earlier Honors

- Coca-Cola Scholar, 1997-2001 ; Tylenol Scholar, 1997-1999 ; Big 33 Scholar, 1997-1998
- Tau Beta Pi, 2000 ; Eta Kappa Nu, 2000 ; Sigma Xi, 2000 ; Order of Omega, 1999
- Congressional Award, Silver (1996) and Bronze (1993) medals

Advising

Current Advisees

Ph.D.	Sam Ginzburg, Nanqinqin Li, Jianan Lu, Ashwini Raina

Ph.D. Committee

Reader	Linpeng Tang (2018), Muneeb Ali (2017), Naga Katta (2016), Tahir Azim (2013, Stanford), Ewen Cheslack-Postava (2013, Stanford), Wonho Kim (2012), Anirudh Badam (2012), Ariel Feldman (2012), Minlan Yu (2011), Yi Wang (2009), Haakon Ringberg (2009), Changhoon Kim (2009)
Non-Reader	Sven Dorkenwald (2022), Khiem Ngo (2021), Jennifer Gossels (2020), Mina Tahmasbi Arashloo (2019), Muhammad Shahbaz (2018), Harlan Yu (2012), Joe Wenjie Jiang (2011), Yaping Zhu (2011), Sunghwan Ihm (2011), William Josephson (2010), Elliott Karpilovsky (2009),

Previous Advisees

PostDoc	Ariel Rabkin (2012–2014; then Cloudera, now Google) Erik Nordström (2010–2011; Associate Research Scholar, 2011–2013; then Spotify, now Timescale, Tech Lead) Steven Ko (2009–2010; then/now Associate Professor, SUNY-Buffalo)
PhD	Andrew Or (2016-2021, then/now: Facebook AI) Marcela Melara (2014-2019, then/now: Intel Labs, Research Scientist) Logan Stafman (2015-2019, then/now: Facebook, Research Scientist) Amy Tai (2013-2018, then/now: VMWare Research, Research Scientist) Haoyu (Harris) Zhang (2013-2018, then/now: Google Brain / Google AI) Aaron Blankstein (2011–2017, then/now: Blockstack) Matvey Arye (2011–2016, then/now: Timescale, Tech Lead) Xiaozhou Li (2010–2016, then Barefoot Networks, now co-founder Celer Network) Rob Kiefer (2009–2016, then/now: Timescale, Tech Lead) Prem Gopalan (2008–2014, then/now: Voleon Capital Management) David Shue (2008–2014, then/now: Google, Spanner Advanced Projects Group)

	Wyatt Lloyd (2007–2013, then: Asst. Professor, USC, now: Assoc. Professor, Princeton University) Siddhartha Sen (2007–2013, then: Microsoft Research–SVC, now: Microsoft Research–NYC, Principal Researcher) Jeffrey Terrace (2007–2012, then/now: Google, Cloud Storage Infrastructure Group)
Significant Role	Muneeb Ali (PhD 2017 with Andrea LaPaugh, then co-founder/CEO of Blockstack) Ariel J. Feldman (PhD 2012 with Ed Felten, then two-year PostDoc at UPenn, then Asst. Professor, University of Chicago)
Masters	Raghav Setti (2015; then Facebook), Fanglu (Annie) Liu (2015; then Google), Scott Erickson (2014; then Amazon), Marcela Melara (2014; then Princeton PhD candidate), Nicholas Jones (2012; then Elysium Digital), Matvey Arye (2011; then Princeton PhD candidate), Muneeb Ali (2011; then Princeton PhD candidate), Justin Pettit (2007, Stanford; then Nicira Networks), Robert Soule (2004, NYU; then NYU PhD, Cornell postdoc), Jeff Borden (2004, NYU)
Graduate Visitors	Zhongxing Ming (2012-2013; then/now Asst. Professor, Tsinghua University)
Undergrad	**Princeton:** 2018–2019: Andrew Spencer 2016–2017: Hee Joo Nam 2013–2014: Kiiru (Samuel) Gichohi, Andrew Grasso, Gregory Owen 2012–2013: Nicolas Crowell, Craig Liebmann, Torin Rudeen, Anna Kornfeld Simpson, Andrew Werner 2011–2012: Michael Franklin, Amy Ousterhout 2010–2011: Gabrielle Chen, Eddy Ferreira, Emily Lancaster, Kay Ousterhout, Brandon Podmayersky, Patrick Wendell, Zhihong Xu 2009–2010: Paul Cavallaro, Dmitri Garbuzov, Andrew Gwozdz, Sajid Mehmood, Kay Ousterhout, Chris Rucinski, Patrick Wendell 2008–2009: Newton Allen, Hao Eric Liu, Andrew Schran, Sean Stern, Jennifer Yu 2007–2008: Hal Laidlaw, Mark Spear **Stanford:** 2006–2007: Jeffrey Spehar **NYU:** 2003–2004: Kevin Shanahan, Ed Kupershlak

Honors by student research advisees

Siebel Graduate Scholarship: Amy Tai (PhD), 2017

NSF Graduate Fellowship: Anna Kornfeld Simpson (as undergrad), 2015

Siebel Graduate Scholarship: Xiaozhou Li (PhD), 2014

Princeton Gordon Wu Prize for Excellence: Prem Gopalan, 2013

Siebel Graduate Scholarship: Marcela Melara (MSE), 2013

Google Anita Borg Memorial Scholarship: Anna Kornfeld Simpson, 2013

Google Anita Borg Memorial Scholarship: Amy Ousterhout, 2013

Hertz and NSF Fellowship: Amy Ousterhout (as undergrad), 2013

Princeton Gordon Wu Prize for Excellence: Wyatt Lloyd, 2012

Google Anita Borg Memorial Scholarship, Finalist: Amy Ousterhout, 2012

Facebook Ph.D. Fellowship, Finalist: Wyatt Lloyd, 2012

CRA Outstanding Undergrad Researcher, Honorable Mention: Zhihong Xu, 2012

Princeton Computer Science, Accenture Prize: Zhihong Xu, 2011

Princeton Computer Science, Accenture Prize: Brandon Podmayersky, 2011

Siebel Graduate Scholarship: Wyatt Lloyd (PhD), 2011

Siebel Graduate Scholarship: Nicholas Jones (MSE), 2011

Princeton SEAS, Calvin Dodd MacCraken Senior Project Award: Patrick Wendell, 2011

Princeton Computer Science, Senior Independent Work Prize: Patrick Wendell, 2011

NDSEG and NSF Graduate Fellowship: Patrick Wendell (as undergrad), 2011

Hertz and NSF Graduate Fellowship: Kay Ousterhout (as undergrad), 2011

CRA Outstanding Undergrad Researcher, Winner (male): Patrick Wendell, 2011

CRA Outstanding Undergrad Researcher, Honorable Mention: Kay Ousterhout, 2011

Google Anita Borg Memorial Scholarship: Kay Ousterhout, 2011

Princeton Computer Science, Accenture Prize: Kay Ousterhout, 2010

Google Ph.D. Fellowship in Fault Tolerance: Siddhartha Sen, 2009-2012

Princeton Computer Science, Senior Thesis Prize: Andrew Schran, 2009

Professional activities

Organizer	SOCC '15 (technical program co-chair) LADIS '15 (technical program co-chair) SOSP '13 (workshop chair) HotDep '12 (technical program co-chair) IPTPS '10 (technical program co-chair) NSDI '09 (poster chair)
Program comm.	NSDI '19 (Summer) NSDI '18 SOCC '15, HotOS '15 NSDI '14 NSDI '13, HotOS '13, HotDep '13 NSDI '12, FOCI '12 SIGCOMM '11, HotOS '11, CCS '11, FOCI '11 OSDI '10, NSDI '10 SOSP '09, NSDI '09, IEEE Security and Privacy '09, USENIX Technical '09, IPTPS '09, LADIS '09 CCS '08, CT-RSA '08, IPTPS '08, ROADS '08 WORLDS '06, UPGRADE-CDN '06 IRIS Student P2P Workshop '03
Funding Panels	NSF SBIR '20, NSF CISE CNS (Ad-hoc) '13, NSF CISE Computer Systems Research (CSR) '10, NSF CISE Network Science and Engineering (NetSE) '09
External reviews	NSDI '16, NSDI '11, NSDI '08, NSDI '07, LATIN '06, HotNets '05, EUROCRYPT '05, Usenix Technical '05, ISC '04, CRYPTO '04, IPDPS '04, INFOCOM '04, CCS '03, SOSP '03, ISC '03, PODC '03, EUROCRYPT '03, WPES '02
Journal reviews	Communications of the ACM (CACM), Transactions on Computer Systems (ToCS), Transactions of Networking (ToN), SIGCOMM Computer Communication Review (CCR), Journal of Computer Security, Journal of Parallel and Distributed Computing (JPDC), Handbook of Internet Security - P2P Security (Wiley & Sons), Computer Journal

Teaching

Numbers correspond to final enrollment tallies, and do not include auditors or mid-term drops.

9/22–1/23	**Instructor.** COS-IW09 – Product Manager Bootcamp, Princeton. (16 students)
2/22–6/22	**Instructor.** COS-418 – Distributed Computer Systems, Princeotn (50 students)
2/20–6/20	**Instructor.** COS-461 – Computer Networks, Princeton. (57 students)
9/19–1/20	**Instructor.** COS-418/518 – Joint Distributed + Advanced Computer Systems, Princeton. (140 students)
2/19–6/19	**Instructor.** COS-518 – Advanced Computer Systems, Princeton.
2/18–6/18	**Instructor.** COS-518 – Advanced Computer Systems, Princeton (24 students).
9/17–1/18	**Instructor.** COS-418 – Distributed Systems, Princeton. (50 students)
9/17–1/18	**Instructor.** COS Independent Work Seminar 06 – Building Secure Decentralized Applications Using the Blockchain, Princeton. (9 students)
2/17–6/17	**Instructor.** COS-518 – Advanced Computer Systems, Princeton. (12 students)
9/16–1/17	**Instructor.** COS-418 – Distributed Systems, Princeton. (52 students)
2/14–6/14	**Instructor.** COS-461 – Computer Networks, Princeton. (75 students)
9/13–1/14	**Instructor.** COS-518 – Advanced Computer Systems, Princeton. (33 students)
2/13–6/13	**Instructor.** COS-461 – Computer Networks, Princeton. (56 students)
9/12–1/13	**Instructor.** COS-561 – Advanced Networking, Princeton. (23 students)
9/11–1/12	**Instructor.** COS-518 – Advanced Computer Systems, Princeton. (30 students)
2/11–6/11	**Instructor.** COS-461 – Computer Networks, Princeton. (62 students)
9/10–1/11	**Instructor.** COS-597b – Grad Seminar: Future Datacenter Networks and Systems, Princeton. (20 students)
2/10–6/10	**Instructor.** COS-461 – Computer Networks, Princeton. (49 students)
9/09–1/10	**Instructor.** COS-518 – Advanced Operating Systems, Princeton. (8 students)
2/09–6/09	**Instructor.** COS-461 – Computer Networks, Princeton. (40 students)
9/08–1/09	**Instructor.** COS-597b – Grad Seminar: Systems and Networking for Virtual Worlds, Princeton. (8 students)
9/07–1/08	**Instructor.** COS-518 – Advanced Operating Systems, Princeton. (18 students)
1/04–5/04	**Teaching Assistant, Lab Instructor.** V22.0480 – Computer Networks, NYU.
2/02–5/02	**Teaching Assistant.** 6.033 – Computer System Engineering, MIT.
2/01–5/01	**Teaching Assistant.** 6.033 – Computer System Engineering, MIT.

Service

7/21–present	**Faculty Advisory Committee on Innovation**, Princeton University.
7/17–1/22	**Director of Graduate Studies**, Princeton Computer Science.
9/18–7/19	**Industry Affiliates committee**, Computer Science, Princeton University.
7/17–6/20	**Policy Committee, Faculty Committee on the Graduate School**, Princeton University.
9/18–9/18	**Silicon Valley Tiger Trek, Faculty Committee**, Princeton University.
7/17–6/20	**Executive Committee, Entrepreneurship Program**, Princeton Keller Center for Innovation in Engineering Education.

9/16–6/17	**Faculty Hiring Search Committee**, Systems Search Chair, Princeton Computer Science.
4/16–6/18	**Campus Plan Advisory Group**, Princeton University.
4/13–6/13	**Child Care Provider Selection Working Group**, Princeton University.
9/12–6/13	**Faculty Hiring Search Committee**, Princeton Computer Science.
6/12–9/12	**Chair, Curriculum Committee**, Princeton Computer Science.
9/10–8/13	**Committee on Grading**, Princeton University.
9/10–present	**Academic Advisor and Faculty Fellow.** Princeton A.B. Majors (Freshman and Sophomores), Wilson College.
9/09–5/14	**Departmental Colloquia Organizer.** Princeton Computer Science.
9/08–5/10	**Freshman Academic Advisor.** Princeton B.S.E. Majors, Wilson College.
2/08–5/11	**Academic Advisor.** Princeton Computer Science B.S.E Majors, Class of 2011.
2/08–present	**Faculty Associate.** Princeton Center for Information Technology Policy.
9/07–5/08	**Faculty Fellow.** Princeton Center for Jewish Life.
5/03–5/05	**Founder and Organizer.** NYU Systems Reading Group, New York, NY.
2/04–5/05	**Faculty Representative.** NYU Courant Student Organization, New York, NY.
9/01–5/02	**Co-organizer.** MIT Applied Security Reading Group, Cambridge, MA.
9/97–5/02	**President, VP, Winter School Organizer, Member.** MIT Outing Club, Cambridge, MA

Technical Advisory and Consulting

5/17–2/18	**In8**. Princeton, NJ. Advisor to artificial intelligence and machine learning startup. Acquired by Google Brain.
7/15–present	**Blockstack Labs**. New York, NY. Technical advisor for venture-backed startup focusing on online identity and blockchain infrastructure services.
6/11–7/13	**Institute for Defense Analyses (IDA).** Alexandria, VA.
6/11–12/13	**Intelligent Automation, Inc.** Rockville, MD. Helped design secure content distribution network for dynamic tactical environments, as part of AFOSR project.
3/09–8/10	**Cloudflare**. Bay Area, CA. Advised CDN and security startup that proxies and filters websites' Web and DNS traffic to improve performance and curtail malicious attacks.
8/07–9/08	**NetFlix** Los Gatos, CA. Helped design content distribution network and datacenter architecture to support online distribution of short and full-length videos.
11/06–9/07	**Quova** Mountain View, CA. Helped design and build GeoPoint v6.0, an IP geolocation and analytics platform, which incorporated architectural and technical aspects of illuminati research. Quova was acquired by Neustar in 2010.
	Expert experience with patent, copyright, and digital forensics cases. References available upon request.

Refereed journal and conference publications

- Google Scholar: Citations (19302), h-index (55), i10-index (99), as of October 4, 2022. `http://scholar.google.com/citations?user=BFE6IQwAAAAJ`

[1] Andrew Or, Haoyu Zhang, and **Michael J. Freedman**. VirtualFlow: Decoupling deep learning models from the underlying hardware. In *Proc. Fifth Conference on Machine Learning and Systems*, Santa Clara, CA, August 2022.

[2] Nanqinqin Li, Anja Kalaba, **Michael J. Freedman**, Wyatt Lloyd, and Amit Levy. Speculative Recovery: Cheap, highly available fault tolerance with disaggregated storage. In *Proc. USENIX Annual Technical Conference (ATC 22)*, Carlsbad, CA, July 2022.

[3] Andrew Or, Haoyu Zhang, and **Michael J. Freedman**. Resource elasticity in distributed deep learning. In *Proc. Third Conference on Machine Learning and Systems (MLSys 20)*, Austin, TX, March 2020.

[4] Logan Stafman, Andrew Or, and **Michael J. Freedman**. ReLAQS: Reducing latency for multi-tenant approximate queries. In *Proc. ACM/IFIP Middleware Conference*, UC Davis, CA, December 2019.

[5] Amy Tai, Andrew Kryczka, Shobhit Kanaujia, Kyle Jamieson, **Michael J. Freedman**, and Asaf Cidon. Who's afraid of uncorrectable bit errors? online recovery of flash errors with distributed redundancy. In *Proc. USENIX Annual Technical Conference (ATC 19)*, Renton, WA, July 2019.

[6] Haoyu Zhang, Brian Cho, Ergin Seyfe, Avery Ching, and **Michael J. Freedman**. Riffle: Optimized shuffle service for large-scale data analytics. In *Proc. European Conference on Computer Systems (EuroSys 18)*, Porto, Portugal, April 2018. 15 pages.

[7] Haoyu Zhang, Logan Stafman, Andrew Or, and **Michael J. Freedman**. SLAQ: Quality-driven scheduling for distributed machine learning. In *Proc. ACM Symposium on Cloud Computing (SOCC 17)*, Santa Clara, CA, September 2017. 14 pages.

[8] Aaron Blankstein, Siddhartha Sen, and **Michael J. Freedman**. Hyperbolic caching: Flexible caching for web applications. In *Proc. USENIX Annual Technical Conference (ATC 17)*, Santa Clara, CA, July 2017. 14 pages.

[9] Michael Wei, Amy Tai, Christopher J. Rossbach, Ittai Abraham, Maithem Munshed, Medhavi Dhawan, Udi Wieder, Scott Fritchie, Steven Swanson, **Michael J. Freedman**, and Dahlia Malkhi. vCorfu: A cloud-scale object store on a shared log. In *Proc. 14th Symposium on Networked Systems Design and Implementation (NSDI 17)*, Boston, MA, March 2017. 15 pages.

[10] Haoyu Zhang, Ganesh Ananthanarayanan, Peter Bodik, Matthai Philipose, Paramvir Bahl, and **Michael J. Freedman**. Live video analytics at scale with approximation and delay-tolerance. In *Proc. 14th Symposium on Networked Systems Design and Implementation (NSDI 17)*, Boston, MA, March 2017. 16 pages.

[11] Amy Tai, Michael Wei, **Michael J. Freedman**, Ittai Abraham, and Dahlia Malkhi. Replex: A scalable, highly available multi-index store. In *Proc. USENIX Annual Technical Conference (ATC 16)*, Denver, CO, June 2016. 14 pages.

[12] Muneeb Ali, Jude Nelson, Ryan Shea, and **Michael J. Freedman**. Blockstack: Design and implementation of a global naming system with Blockchains. In *Proc. USENIX Annual Technical Conference (ATC 16)*, Denver, CO, June 2016. 14 pages.

[13] Xiaozhou Li, Raghav Setti, David G. Andersen, Michael Kaminsky, and **Michael J. Freedman**. Be fast, cheap and in control with SwitchKV. In *Proc. 13th Symposium on Networked Systems Design and Implementation (NSDI 16)*, Santa Clara, CA, March 2016. 14 pages.

[14] Marcela Melara, Aaron Blankstein, Joseph Bonneau, Edward Felten, and **Michael J. Freedman**. Bringing Deployable Key Transparency to End Users. In *Proc. USENIX Security*, Washington, D.C., August 2015. 16 pages.

[15] Naga Katta, Haoyu Zhang, **Michael J. Freedman**, and Jennifer Rexford. Ravana: Controller fault-tolerance in software-defined networking. In *Proc. Symposium on SDN Research*, Santa Clara, CA, June 2015. 12 pages.

[16] **Michael J. Freedman**, Carmit Hazay, Kobbi Nissim, and Benny Pinkas. Efficient set intersection with simulation-based security. *IACR Journal of Cryptology*, October 2014. 35 pages.

[17] Robert Kiefer, Erik Nordström, and **Michael J. Freedman**. From Feast to Famine: Managing mobile network resources across environments and preferences. In *Proc. 2nd USENIX Conference on Timely Results in Operating Systems (TRIOS)*, Broomfield, CO, October 2014. 14 pages.

[18] Peng Sun, Minlan Yu, Michael J. Freedman, Jennifer Rexford, and David Walker. HONE: Joint Host-Network Traffic Management in Software-Dened Networks. *Journal of Network and Systems Management, special issue on software-defined networking*, July 2014. 26 pages.

[19] Tom Anderson et al. A brief overview of the NEBULA future internet architecture. *ACM SIGCOMM Computer Communication Review (CCR)*, 44, July 2014. 6 pages.

[20] Aaron Blankstein and **Michael J. Freedman**. Automating isolation and least privilege in web services. In *Proc. 35th IEEE Symposium on Security and Privacy*, San Jose, CA, May 2014. 16 pages.

[21] David Shue and **Michael J. Freedman**. From app requests to virtual IOPs: Provisioned key-value storage with Libra. In *Proc. ACM European Conference on Computer Systems (EuroSys)*, Amsterdam, The Netherlands, April 2014. 14 pages.

[22] Xiaozhou Li, David G. Andersen, Michael Kaminsky, and **Michael J. Freedman**. Algorithmic improvements for fast concurrent cuckoo hashing. In *Proc. ACM European Conference on Computer Systems (EuroSys)*, Amsterdam, The Netherlands, April 2014. 14 pages.

[23] Ariel Rabkin, Matvey Arye, Siddhartha Sen, Vivek Pai, and **Michael J. Freedman**. Aggregation and Degradation in JetStream: Streaming analytics in the wide area. In *Proc. 11th Symposium on Networked Systems Design and Implementation (NSDI 14)*, Seattle, WA, April 2014. 14 pages.

[24] Siddhartha Sen, David Shue, Sunghwan Ihm, and **Michael J. Freedman**. Scalable, optimal flow routing in datacenters via local link balancing. In *Proc. 9th International Conference on emerging Networking EXperiments and Technologies (CoNEXT 13)*, Santa Barbara, CA, December 2013. 12 pages.

[25] Xiaozhou Li and **Michael J. Freedman**. Scaling IP multicast on datacenter topologies. In *Proc. 9th International Conference on emerging Networking EXperiments and Technologies (CoNEXT 13)*, Santa Barbara, CA, December 2013. 12 pages.

[26] Wyatt Lloyd, **Michael J. Freedman**, Michael Kaminsky, and David G. Andersen. Stronger semantics for low-latency geo-replicated storage. In *Proc. 10th Symposium on Networked Systems Design and Implementation (NSDI 13)*, Lombard, IL, April 2013. 14 pages.

[27] David Shue, **Michael J. Freedman**, and Anees Shaikh. Fairness and isolation in multi-tenant storage as optimization decomposition. *ACM SIGOPS Operating System Review*, 47(1), January 2013. 6 pages.

[28] Prem Gopalan, David Mimno, Sean Gerrish, **Michael J. Freedman**, and David Blei. Scalable inference of overlapping communities. In *Proc. Neural Information Processing Systems (NIPS 12)*, Lake Tahoe, NV, December 2012. Spotlight paper, 9 pages.

[29] Matvey Arye, Erik Nordström, Robert Kiefer, Jennifer Rexford, and **Michael J. Freedman**. A formally-verified migration protocol for mobile, multi-homed hosts. In *Proc. IEEE International Conference on Network Protocols (ICNP 12)*, Austin, TX, October 2012. 10 pages.

[30] David Shue, **Michael J. Freedman**, and Anees Shaikh. Performance isolation and fairness for multi-tenant cloud storage. In *Proc. 10th Symposium on Operating Systems Design and Implementation (OSDI 12)*, Hollywood, CA, October 2012. 14 pages.

[31] Ariel J. Feldman, Aaron Blankstein, **Michael J. Freedman**, and Edward W. Felten. Social networking with Frientegrity: Privacy and integrity with an untrusted provider. In *Proc. USENIX Security*, Bellevue, WA, August 2012. 16 pages.

[32] Jeffrey Terrace, Ewen Cheslack-Postava, Philip Levis, and **Michael J. Freedman**. Unsupervised conversion of 3D models for interactive metaverses. In *Proc. IEEE International Conference on Multimedia & Expo (ICME 12)*, Melbourne, Australia, July 2012. 6 pages.

[33] Ewen Cheslack-Postava, Tahir Azim, Behram F. T. Mistree, Daniel Reiter Horn, Jeff Terrace, Philip Levis, and **Michael J. Freedman**. A scalable server for 3D metaverses. In *Proc. USENIX Annual Technical Conference (ATC 12)*, Boston, MA, June 2012. 14 pages.

[34] Erik Nordström, David Shue, Prem Gopalan, Rob Kiefer, Matvey Arye, Steven Ko, Jennifer Rexford, and **Michael J. Freedman**. Serval: An end-host stack for service-centric networking. In *Proc. 9th Symposium on Networked Systems Design and Implementation (NSDI 12)*, San Jose, CA, April 2012. 14 pages.

[35] Siddhartha Sen and **Michael J. Freedman**. Commensal Cuckoo: Secure group partitioning for large-scale services. *ACM SIGOPS Operating System Review*, January 2012. 7 pages.

[36] Patrick Wendell and **Michael J. Freedman**. Going Viral: Flash crowds in an open CDN. In *Proc. 11th ACM SIGCOMM Conference on Internet Measurement (IMC 11)*, Berlin, Germany, November 2011. 7 pages.

[37] Wyatt Lloyd, **Michael J. Freedman**, Michael Kaminsky, and David G. Andersen. Don't settle for eventual: Scalable causal consistency for wide-area storage with COPS. In *Proc. 23rd ACM Symposium on Operating Systems Principles (SOSP 11)*, Cascais, Portugal, October 2011. 16 pages.

[38] Christina Aperjis, **Michael J. Freedman**, and Ramesh Johari. Bilateral and multilateral exchanges for peer-assisted content distribution. *IEEE/ACM Transactions on Networking*, 19(5), October 2011. 14 pages.

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[152] Siddhartha Sen, Wyatt Lloyd, and **Michael J. Freedman**. Prophecy: Using history for high-throughput fault tolerance (work-in-progress). In *22nd ACM Symposium on Operating Systems Principles (SOSP 09)*, Big Sky, MT, October 2009.

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[154] Jeff Terrace and **Michael J. Freedman**. Query-anywhere chain replication (poster). In *2nd Workshop on Large-Scale Distributed Systems and Middleware (LADIS 08)*, Yorktown, NY, September 2008.

[155] Siddhartha Sen, Wyatt Lloyd, and **Michael J. Freedman**. Scaling fault-tolerant systems with history (poster). In *2nd Workshop on Large-Scale Distributed Systems and Middleware (LADIS 08)*, Yorktown, NY, September 2008.

[156] **Michael J. Freedman** and Martin Casado. Measuring the Internet's edge with Illuminati (poster and demo). In *7th USENIX Symposium on Operating Systems Design and Implementation (OSDI 06), 3rd Workshop on Real, Large, Distributed Systems (WORLDS 06)*, Seattle, WA, November 2006.

[157] **Michael J. Freedman**, Karthik Lakshminarayanan, and David Mazières. Building a practical anycast service (demo). In *2nd Workshop on Real, Large, Distributed Systems (WORLDS 05)*, San Francisco, CA, December 2005.

[158] Kevin Shanahan and **Michael J. Freedman**. Saccades: Locality prediction for oblivious clients (poster). In *2nd IRIS Student Workshop on Peer-to-Peer Systems*, Cambridge, MA, November 2004.

[159] Siddhartha Annapureddy, **Michael J. Freedman**, and David Mazières. Shark: A scalable and secure cooperative-caching file system (poster). In *1st Symposium on Networked Systems Design and Implementation (NSDI 04)*, San Francisco, CA, March 2004.

[160] **Michael J. Freedman**, Eric Freudenthal, and David Mazières. Democratizing content publication with Coral (demo). In *1st Symposium on Networked Systems Design and Implementation (NSDI 04)*, San Francisco, CA, March 2004.

Refereed conference presentations

[161] Performant time series data management and analytics with PostgreSQL. Strata Data Conference NYC, September 26 2019.

[162] Performant time series data management and analytics with PostgreSQL. Strata Data Conference London, May 2 2019.

[163] Performant time series data management and analytics with Postgres. Data Day Texas, January 26 2019.

[164] Performant time series data management and analytics with Postgres. Strata Data Conference, September 12 2018.

[165] Three heretical opinions about the future of time-series data. docScale Conference, June 1 2018.

[166] TimescaleDB: Reengineering PostgreSQL as a time series database. PostgresConf US, April 18 2018.

[167] TimescaleDB: Reengineering PostgreSQL as a time series database. Strata Data Conference, March 8 2018.

[168] When boring is awesome: Making PostgreSQL scale for time-series data. Strata Data Conference, September 27 2017.

[169] TimescaleDB: Re-architecting a SQL database for time-series data. DataEng Conference, October 31 2017.

[170] Building a scalable time-series database on PostgreSQL. PGConf Local: Philly, July 14 2017.

[171] TimescaleDB: Developing a scalable time-series database on PostgreSQL. PGConf US, March 31 2017.

[172] Designing a time series database to support IoT workloads. Strata Data Conference, March 15 2017.

[173] Spark Streaming and IoT. Spark Summit East, February 18 2016.

[174] Collaborative, privacy-preserving data aggregation at scale. 10th Privacy Enhancing Technologies Symposium (PETS 10), July 21 2010.

[175] Experiences with CoralCDN: A five-year operational view. 7th Symposium on Networked Systems Design and Implementation (NSDI 10), April 28 2010.

[176] Prices are Right: Managing resources and incentives in peer-assisted content distribution. 7th International Workshop on Peer-to-Peer Systems (IPTPS 08), February 26 2008.

[177] OASIS: Anycast for any service. 3rd Symposium on Networked Systems Design and Implementation (NSDI 06), May 9 2006.

[178] Group therapy for systems: Using link attestations to manage failures. 5th International Workshop on Peer-to-Peer Systems (IPTPS 06), February 28 2006.

[179] OASIS: Anycast for any service. CodeCon, February 10 2006.

[180] Non-transitive connectivity and DHTs. 2nd Workshop on Real, Large, Distributed Systems (WORLDS 05), December 14 2005.

[181] Keyword search and oblivious pseudorandom functions. 2nd Theory of Cryptography Conference (TCC 05), Feburary 11 2005.

[182] Efficient private matching and set intersection. Advances in Cryptology — EUROCRYPT 2004, May 3 2004.

[183] Democratizing content distribution with Coral. 1st Symposium on Networked Systems Design and Implementation (NSDI 04), March 30 2004.

[184] Efficient set intersection for privacy-preserving data mining. DIMACS Privacy-Preserving Data Mining, March 15 2004.

[185] Sloppy hashing and self-organizing clusters. 2nd International Workshop on Peer-to-Peer Systems (IPTPS 03), February 20 2003.

[186] Tarzan: A peer-to-peer anonymizing network layer. 9th ACM Conference on Computer and Communications Security (CCS 02), November 20 2002.

[187] The case for network-layer, peer-to-peer anonymization. 1st International Workshop on Peer-to-Peer Systems (IPTPS 02), March 7 2002.

[188] Privacy engineering in digital rights management systems. ACM Workshop in Security and Privacy in Digital Rights Management (DRM 01), November 5 2001.

Invited conference presentations and panels

[189] Building an open-source time-series database for wide-area data. CRA/CCC Workshop on Wide-Area Data Analytics, October 3 2019.

[190] Time-series workloads are different, and implications for a time-series database. Sarnoff Symposium, September 26 2019.

[191] Building a scalable time-series database on PostgreSQL. PGConf US Mini: NYC, September 14 2017.

[192] Building a scalable time-series database on PostgreSQL. Percona Live, April 26 2017.

[193] Open source database ecosystem. Percona Live, April 25 2017.

[194] Poor video streaming performance explained (and fixed). ACM Applicative Conference, June 2 2016.

[195] City-wide environmental sensing via BreatheNYC. NYC BigApps 2015 - Finals, December 2 2015.

[196] The Internet of Things, Infinite Opportunities Together (panel). MIT Sloan Alumni Event Series, November 19 2015.

[197] Stronger consistency for low-latency, geo-replicated storage. Microsoft Research Faculty Summit, July 15 2014.

[198] Automating isolation and least privilege in web services. DIMACS Workshop on Secure Cloud Computing, March 28 2014.

[199] Multi-tenant resource allocation for shared cloud storage. New Results in Networking Research 2013, Microsoft Research, December 5 2013.

[200] Service-centric networking for datacenter services. Eighth Annual Microsoft Research Networking Summit, June 19 2012.

[201] Service-centric networking with the Serval network stack. DIMACS Workshop on Systems and Networking Advances in Cloud Computing, December 8 2011.

[202] An Internet primer: Numbers, names, and real people -and- Take-down experiences by a non-commercial content delivery service (keynote). Copyright Cat-and-Mouse: New Developments in Online Enforcement, Princeton Center for Information Technology Policy (CITP) Workshop, March 13 2012.

[203] Next technical steps (panel). Free and Open Communication on the Internet Workshop, February 24 2011.

[204] Stop building distributed services with a decoupled host-centric network. Vancouver Systems Colloquium (following OSDI 10), October 7 2010.

[205] Meru: A system architecture for Internet-scale virtual worlds. NSF Workshop on Future of Research in Computer Games and Virtual Worlds, September 23 2010.

[206] Make CDNs work for you: Measuring the Internet's edge with Illuminati (talk and panel). New York Systems/Networking Summit, November 17 2006.

[207] Lessons from PlanetLab (panel). WORLDS, November 5 2006.

[208] Supporting clients 24/7: On service deployment and development. PlanetLab Workshop, April 1 2004.

[209] Accountability and resource management in peer-to-peer systems. O'Reilly Peer-to-Peer Conference, February 16 2001.

Other invited presentations

[210] TimescaleDB: Re-engineering PostgreSQL as a time-series database. IBM Linux on Z Meetup, December 1 2017.

[211] TimescaleDB: Re-engineering PostgreSQL as a time-series database. Carnegie Mellon: Time Series Database Lectures, November 16 2017.

[212] TimescaleDB: A scalable time-series database built on PostgreSQL. San Francisco Bay Area PostgreSQL Meetup Group, October 18 2017.

[213] Poor video streaming performance explained (and fixed). Facebook, July 5 2016.

[214] Coping with untrusted or vulnerable cloud services. University of Hawaii, July 2 2014.

[215] Privacy with untrusted clouds or uncertain code. National Security Agency, May 29 2013.

[216] Performance isolation and fairness for multi-tenant cloud storage. University of California, Berkeley, December 4 2012.

[217] Performance isolation and fairness for multi-tenant cloud storage. Intel Science and Technology Center–Cloud Computing Retreat, November 30 2012.

[218] Serval: An end-host stack for service-centric networking. Google–Seattle, August 8 2012.

[219] Serval: An end-host stack for service-centric networking. Amazon, June 20 2012.

[220] Privacy and integrity in the untrusted cloud. University of Washington, June 20 2012.

[221] Serval: An end-host stack for service-centric networking. IBM, April 24 2012.

[222] Serval: An end-host stack for service-centric networking. Facebook, April 24 2012.

[223] Serval: An end-host stack for service-centric networking. Google–Mountain View, April 23 2012.

[224] Software-defined networking for services. SDN Meetup, Organized by Cisco Systems, December 19 2011.

[225] New abstractions for managing networked services. Harvard University, December 14 2011.

[226] Service-centric networking with a new service access layer. Qualcomm, March 21 2011.

[227] SPORC: Group collaboration using untrusted cloud resources (work-in-progress). 10th Privacy Enhancing Technologies Symposium (PETS 10), July 21 2010.

[228] Building a service-centric network with SCAFFOLD. Stanford University, Network Seminar, January 14 2010.

[229] Building a service-centric network with SCAFFOLD. HP Labs, January 13 2010.

[230] High-throughput replicated services with strong robustness guarantees. EPFL, August 14 2009.

[231] High-throughput replicated services with strong robustness guarantees. ETH Zurich, August 10 2009.

[232] Experiences with CoralCDN: A five-year operational view. Microsoft Research, March 13 2009.

[233] An overview of datacenter-focused systems projects. Facebook, December 12 2008.

[234] Peer-assisted content distribution with prices. Yahoo! Research, December 11 2008.

[235] Democratizing content distribution. U. Hawaii, July 11 2008.

[236] The role of prices in peer-assisted content distribution. Princeton/Supelec/Alcatel-Lucent Workshop on Wireless Communications and Networks, February 4 2008.

[237] P2P-CDNs: Content distribution via access links. PRISM Center for Networks, Science, and Applications Workshop, December 6 2007.

[238] Towards peer-assisted content distribution. NEC Labs, November 28 2007.

[239] Democratizing content distribution. New York University, April 27 2007.

[240] Democratizing content distribution. University of California, San Diego, April 25 2007.

[241] Democratizing content distribution. Intel Research–Berkeley, April 23 2007.

[242] Democratizing content distribution. University of Washington, April 19 2007.

[243] Democratizing content distribution. University of California, Los Angeles, April 17 2007.

[244] Democratizing content distribution. Carnegie-Mellon University, April 9 2007.

[245] Democratizing content distribution. Microsoft Research, Silicon Valley Center, April 2 2007.

[246] Democratizing content distribution. Princeton University, March 29 2007.

[247] Democratizing content distribution. Stanford University, March 22 2007.

[248] Democratizing content distribution. Duke University, March 19 2007.

[249] Democratizing content distribution. Massachusetts Institute of Technology, March 15 2007.

[250] Democratizing content distribution. Cornell University, March 13 2007.

[251] Democratizing content distribution. Brown University, March 8 2007.

[252] Democratizing content distribution. Palo Alto Research Center, March 5 2007.

[253] Democratizing content distribution. University of Texas, Austin, March 1 2007.

[254] Democratizing content distribution. Yale University, February 15 2007.

[255] Democratizing content distribution. Columbia University, February 14 2007.

[256] RE: Fighting spam with reliability and privacy. Princeton University, Systems Seminar, November 20 2006.

[257] RE: Fighting spam with reliability and privacy. Cornell University, Security Seminar, November 15 2006.

[258] RE: Reliable Email. Georgia Tech, Network Research Seminar, October 11 2006.

[259] RE: Reliable Email. Microsoft Research, Silicon Valley Center, July 19 2006.

[260] Illuminating the shadows of the Internet. Quova, Inc., June 28 2006.

[261] OASIS: Anycast for any service. Xeros Palo Alto Research Center, February 22 2006.

[262] Privacy-preserving protocols through polynomial encodings. U.C. Berkeley, Theory Seminar, February 13 2006.

[263] Privacy-preserving protocols through polynomial encodings. UCLA, January 24 2006.

[264] Shark: Scaling file servers via cooperative caching. ICSI Seminar, June 15 2005.

[265] The design and deployment of Coral, an open peer-to-peer content distribution network. U.C. Berkeley, Systems Seminar, September 13 2004.

[266] Democratizing content distribution with Coral. O'Reilly Foo Camp, September 11 2004.

[267] Democratizing content distributing with Coral. Columbia University, Systems Seminar, March 25 2004.

[268] Private matching. CRYPTO '03 (rump session), August 18 2003.

[269] Anonymous communication and the design of Tarzan. Virginia Tech, NOVA, November 20 2002.

[270] Building a peer-to-peer anonymizing network layer. New York University, Public Design Workshop, September 13 2002.

[271] Digital rights management and cryptographic privacy. MIT Network and Computer Security class, November 1 2001.

[272] Accountability and resource management in P2P systems. Lotus Research, P2P Speaker's Series, May 2 2001.

Support

- Asaf Cidon and **Michael J. Freedman**. The Case for Blended Storage. NSF CSR: Medium (#2106530). $375K to Princeton, total of $750K. 2021-2024.
- **Michael J. Freedman** and Kyle Jamieson. Rethinking Distributed SSD Storage Systems. NSF CSR: Medium (#1763546), $1.2M, 2018-2021.
- **Michael J. Freedman** (PI) and Vivek Pai. JetStream: A Flexible Distributed System for Online and In-Place Data Analysis. NSF: CNS: BIGDATA (#1250990). $700K, 2013-2018.
- **Michael J. Freedman** (PI), linked with Georgia Tech (Nick Feamster, PI) and Tor Project (Roger Dingledine, PI). Facilitating Free and Open Access to Information on the Internet. NSF: Trustworthy Computing: Large (#1111734). $750K to Princeton, total of $3M. 2012-2018.
- **Michael J. Freedman**. Geo-replicated datacenter storage. Intel Science & Technology Center – Cloud Computing (ISTC-CC). $368K. 2011-2016.
- **Michael J. Freedman**. Adaptive Network Architecture for Dynamic End-Points and Distributed Systems. DARPA Computer Science Study Group (CSSG). DARPA-RA-10-76. $100K Phase 1. $400K Phase 2, $250K Phase 3. 2011-2016.
- **Michael J. Freedman**. Alfred P. Sloan Foundation, Research Fellowship. $50K. 2011-2013.
- **Michael J. Freedman** (PI), linked with Philip Levis (Stanford, PI). Meru: Internet-scale Visual Computing. Intel Visual Computing Institute. $140K to Princeton. 2011-2013.
- **Michael J. Freedman** (PI), with 11 other universities (Jonathan Smith, UPenn–Lead PI). NEBULA: A Future Internet That Supports Trustworthy Cloud Computing. NSF Future Internet Architecture (FIA #1040708). $503K to Princeton, total of $7.455M. 2010–2013.
- Larry Peterson (PI), **Michael J. Freedman**, Vivek Pai, and Jennifer Rexford. Development of a Virtual Cloud Computing Infrastructure. NSF Major Research Instrumentation (MRI #1040123). $2.94M. 2010–2014.
- Szymon Rusionkiewicz, Adam Finkelstein, **Michael J. Freedman**, and Tom Funkhouser. Intel Visual Computing Institute, seed funding. $40K. 2010.

- **Michael J. Freedman**. Towards Scalable Datacenter Services with Strong Robustness Guarantees. NSF CSR CAREER (#0953197). $529K. 2009-2017.
- Margaret Martonosi, Jennifer Rexford, **Michael J. Freedman**, Mung Chiang. Adaptive, Energy-Aware Resource Allocation Across Multiple Tenants in Multiple Data Centers. Google Research Award. $100K. 2009.
- **Michael J. Freedman** (PI), Scott Karlin, Larry Peterson, Jennifer Rexford, with 6 other universities and Stanford University (Nick McKeown–Lead PI). Campus Trials of Enterprise GENI. NSF via the GENI Product Office (BBN). $255K to Princeton. 2009–2011.
- **Michael J. Freedman** (PI) and Jennifer Rexford. A SCAFFOLD for GENI-based Distributed Services. NSF via the GENI Product Office (BBN). $432K. 2009–2012.
- **Michael J. Freedman**. A SCAFFOLD for Service-Centric Networking. Cisco University Research Program Fund. $100K. 2009.
- **Michael J. Freedman** (PI), Jen Rexford. A SCAFFOLD for Service-Centric Networking. NSF NeTS Medium (#0904729). $750K. 2009–2013.
- **Michael J. Freedman** (Lead PI), Ramesh Johari (Stanford), Srinivas Shakkotai (Texas A&M). Designing a Content-Aware Internet Ecosystem. NSF NeTS Medium (#0904860). $340K to Princeton, total of $896K. 2009–2013.
- **Michael J. Freedman**. Towards a Service-Centric Network Architecture for Fault Tolerance, Migration, and Mobility. ONR Young Investigator Program. $610K. 2009–2013.
- **Michael J. Freedman**. E. Lawrence Keyes, Jr./Emerson Electric Co. Faculty Advancement Award. $40K. 2009.
- Mung Chiang, **Michael J. Freedman**, Margaret Martenosi, Jennifer Rexford. Green IT: From the Phone to the Data Center. Princeton Grand Challenges Program. $200K. 2009–2011.
- **Michael J. Freedman** (PI) and Tom Funkhouser, linked with Philip Levis (PI), Pat Hanrahan, and Vladlen Koltun (Stanford–Lead). A Network Architecture for Federated Virtual/Physical Worlds. NSF NeTS-ANET Medium (#0831374). $509K to Princeton, total of $1.459M. 2008–2012.

Total Support: $8.75M (PI), $2.94M (co-PI)

References

Available upon request.

Princeton, NJ, November 5, 2022