Michael J. Freedman

AWARD WINNER

Michael J. Freedman

ACM Fellows (2019)

ACM Grace Murray Hopper Award (2018)

2019 ACM Fellows Recognized for Far-Reaching Accomplishments that Define the Digital Age

2018 ACM Grace Murray Hopper Award

ACM Fellows⊘

USA - 2019

CITATION

For contributions to robust distributed systems for the modern cloud

Press Release⊿

ACM Grace Murray Hopper Award⊘

USA - 2018

CITATION

For the design and deployment of self-organizing geo-distributed systems.

Historically, distributed systems were designed for homogenous environments: local clusters, flat peer-to-peer deployments, or abstract models for theoretical analysis. Michael showed how to build scalable, performant, and autonomous distributed systems for modern heterogeneous deployments and realistic workloads.

Unique among systems colleagues, Michael challenged accepted tradeoffs through new algorithms and protocols with formal guarantees, and builds and deploys widely-used systems. His work on CoralCDN reexamines the design of peer-to-peer applications. Traditional distributed hash tables proved woefully unable to handle flash-crowd workloads. By changing the DHT semantics and introducing algorithms to self-organize into a locality-optimized hierarchy of peers, CoralCDN is uniquely designed to find nearby content and handle overload conditions.

Practically, CoralCDN provides free delivery and scalability of p2p systems on one hand, and the ability to support unmodified web clients and servers on the other hand. CoralCDN was perhaps the only academic peer-to-peer system to see real and sustained use, deployed 2004-2015 at roughly 500 PlanetLab sites worldwide, with millions of daily users. Its use varied from solving the "Slashdot" effect, distributing amateur videos of the 2004 Asian Tsunami, and caching websites post-Fukushima in 2011.

Press Release ⎙

2019 ACM Fellows Recognized for Far-Reaching Accomplishments that Define the Digital Age

ACM has named 58 members ACM Fellows for wide-ranging and fundamental contributions in areas including artificial intelligence, cloud computing, combating cybercrime, quantum computing and wireless networking. The accomplishments of the **2019 ACM Fellows** ⧉ underpin the technologies that define the digital age and greatly impact our professional and personal lives. ACM Fellows comprise an elite group that represents less than 1% of the Association's global membership.

"Computing technology has had a tremendous impact in shaping how we live and work today," said ACM President Cherri M. Pancake in announcing the 2019 ACM Fellows. "All of the technologies that directly or indirectly influence us are the result of countless hours of collaborative and/or individual work, as well as creative inspiration and, at times, informed risk-taking. Each year, we look forward to welcoming some of the most outstanding individuals as Fellows. The

ACM Fellows program is a cornerstone of our overall recognition effort. In highlighting the accomplishments of the ACM Fellows, we hope to give credit where it is due, while also educating the public about the extraordinary array of areas in which computing professionals work."

Underscoring ACM's global reach, the 2019 Fellows hail from universities, companies and research centers in Australia, Canada, China, Egypt, France, Germany, Israel, Italy, Switzerland, and the United States.

The contributions of the 2019 Fellows run the gamut of the many sub-disciplines of the computing field—including artificial intelligence, cloud computing, computer graphics, computational biology, data science, security and privacy, software engineering, quantum computing, and web science, to name a few.

Additional information about the 2019 ACM Fellows, as well as previously named ACM Fellows, is available through the **ACM Fellows site** ⌐.

News release ⌐

2018 ACM Grace Murray Hopper Award

ACM named **Constantinos Daskalakis** and **Michael J. Freedman** recipients of the **ACM Grace Murray Hopper Award**.

Daskalakis, a professor at the Massachusetts Institute of Technology, is recognized for his seminal contributions to the theory of computation and economics, particularly the complexity of Nash Equilibrium.

Strategic interaction greatly complicates behavior in socioeconomic environments, from traditional markets and offline social networks to modern technological systems such as online advertising platforms, kidney exchanges, cryptocurrencies, sharing economy applications, and online social networks. To analyze behavior in such strategic environments, economists have long relied on concepts of equilibrium. Daskalakis's work, with Goldberg and Papadimitriou, has challenged equilibrium theory by showing that Nash equilibrium is computationally intractable and thus unattainable, in general. His work has influenced an ongoing reshaping of the study of strategic behavior, showing that computation must play an essential role in the foundations of game theory and economics. Daskalakis's more recent work has resolved long-standing open problems in multi-dimensional mechanism design, and advanced several other fields, including machine learning, probability theory and statistics.

Freedman, a professor at Princeton University, is cited for the design and

deployment of self-organizing geo-distributed systems.

By introducing new algorithms and protocols, Freedman has shown how to build scalable, performant, and autonomous distributed systems for modern heterogeneous deployments and realistic workloads. Some of Freedman's most popular systems include CoralCDN, a content distribution infrastructure that has been deployed at hundreds of network sites worldwide and been used by millions of clients to share images, videos and other content; the JetStream system, which employs an innovative approach to data streaming analytics; and TimescaleDB, an open source time series database that provides complex queries at scale on both historical and fresh data. Additionally, in more fundamental research, Freedman and colleagues have demonstrated that theoretically deep cloud systems need not be slow or scale poorly.

*The **ACM Grace Murray Hopper Award** ⬈ is given to the outstanding young computer professional of the year, selected on the basis of a single recent major technical or service contribution. This award is accompanied by a prize of $35,000. The candidate must have been 35 years of age or less at the time the qualifying contribution was made. Financial support for this award is provided by Microsoft.*