COMMUNICATIONS OF THE ACM

Departments

5 President's Letter

ACM is Built on Volunteers' Shoulders By Alain Chesnais

7 Letters To The Editor

How to Celebrate Codd's RDBMS Vision

8 BLOGECACM

In Search of Database Consistency Michael Stonebraker discusses the implications of the CAP theorem on database management system applications that span multiple processing sites.

10 CACM Online

The Mobile Road Ahead By David Roman

21 Calendar

105 Careers

Last Byte

112 Q&A

Gray's Paradigm

Tony Hey talks about Jim Gray and his vision of a new era of collaborative, data-intensive science. By Leah Hoffmann

News



11 Linear Logic

A novel approach to computational logic is reaching maturity, opening up new vistas in programming languages, proof nets, and security applications.

By Alex Wright

14 Personal Fabrication

Open source 3D printers could herald the start of a new industrial revolution. By Graeme Stemp-Morlock

15 Should Code be Released?

Software code can provide important insights into the results of research, but it's up to individual scientists whether their code is released—and many opt not to.

By Dennis McCafferty

Viewpoints

19 Historical Reflections

Victorian Data Processing Reflections on the first payment systems. By Martin Campbell-Kelly

22 Technology Strategy and Management

Platforms and Services: Understanding the Resurgence of Apple

Combining new consumer devices and Internet platforms with online services and content is proving to be a successful strategy. By Michael A. Cusumano

25 Inside Risks

Risks of Undisciplined Development
An illustration of the problems
caused by a lack of discipline in
software development and our
failure to apply what is known
in the field.

By David L. Parnas

28 Kode Vicious

Version Aversion

The way you number your releases communicates more than you might think. By George V. Neville-Neil

30 Viewpoint

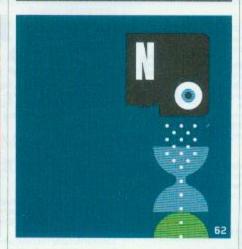
SCORE: Agile Research Group Management

Adapting agile software development methodology toward more efficient management of academic research groups. By Michael Hicks and Jeffrey S. Foster



- **Photoshop Scalability:** Keeping It Simple Clem Cole and Russell Williams discuss Photoshop's long history with parallelism, and what is now seen as the chief challenge. ACM Case Study
- 39 Thinking Clearly About Performance, Part 2 More important principles to keep in mind when designing high-performance software. By Cary Millsap
- Tackling Architectural Complexity with Modeling Component models can help diagnose architectural problems in both new and existing systems. By Kevin Montagne
- Articles' development led by acmount queue.acm.org

Contributed Articles



- A Neuromorphic Approach to Computer Vision Neuroscience is beginning to inspire a new generation of seeing machines. By Thomas Serre and Tomaso Poggio
- How Offshoring Affects IT Workers IT jobs requiring interpersonal interaction or physical presence in fixed locations are less likely to be sent out of the country. By Prasanna B. Tambe and Lorin M. Hitt

72 Peer-to-Peer Systems Within a decade, P2P has become a technology that enables innovative new services, accounts for a fraction of the Internet traffic, and is used by millions of people every day. By Rodrigo Rodrigues and Peter Druschel

Research Highlights

- Technical Perspective A VM 'Engine' That Makes a Difference By Carl Waldspurger
- Difference Engine: Harnessing Memory Redundancy in Virtual Machines By Diwaker Gupta, Sangmin Lee, Michael Vrable, Stefan Savage, Alex C. Snoeren, George Varghese, Geoffrey M. Voelker, and Amin Vahdat
- Technical Perspective **Belief Propagation** By Yair Weiss and Judea Pearl
- Nonparametric Belief Propagation By Erik B. Sudderth, Alexander T. Ihler, Michael Isard, William T. Freeman, and Alan S. Willsky



About the Cover:

Peer-ta-peer systems have quickly evolved beyond their music sharing. anonymous data sharing, and scientific computing origins to become an efficient means for content. distribution and deploying innovative services. As authors Rodrigo Rodrigues and Peter Druschel describe in their cover story beginning on page 72. peer-to-peer systems

are now being used for myriad purposes, including video and telephony, live streaming applications, and to distribute. bulk data to many nodes, as depicted in this month's cover imagery by Marius Watz.