

DEPARTMENT: EDITOR'S LETTER

Ten Years at the Helm of *Communications of the ACM*

In January 2007, I undertook the task of revitalizing *Communications of the ACM*. Now, after 10 years at the helm of *Communications*, it is time for me to move on and for the magazine to get new leadership.

Moshe Y. Vardi

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DEPARTMENT: CERF'S UP

Open Access to Academic Research

One challenge associated with data and publication preservation is the creation of business models that can sustain long-duration archives. Considerable infrastructure must be maintained to ensure access to digital content over ...

Vinton G. Cerf

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DEPARTMENT: LETTERS

TO THE EDITOR

Technologies *Do* Have Ethics

The Cerf's Up column "Social and Ethical Behavior in the Internet of Things" (Feb. 2017) by Francine Berman and Vinton G. Cerf was a welcome reminder of the importance of ethical issues involving sociotechnical systems in general ...

CACM Staff

Pages 8-9

DEPARTMENT:

BLOG@CACM

Balancing Teaching CS Efficiently with Motivating Students

Mark Guzdial suggests a new balance is needed in computer science education between discovery learning and direct instruction.

Mark Guzdial

Pages 10-11

COLUMN: NEWS

Deep Learning Takes on Translation

Improvements in hardware, the availability of massive amounts of data, and algorithmic upgrades are among the factors supporting better machine translation.

Don Monroe

Pages 12-14

Optimization
Search Finds a

Heart of Glass

Analog computing could provide greater efficiency, improved digital algorithms.

Chris Edwards

Pages 15-16

Potential and Peril

The outlook for artificial intelligence-based autonomous weapons.

Sarah Underwood

Pages 17-19

Weaving the Web

Sir Tim Berners-Lee created a paradigm shift that changed the world with his invention of the World Wide Web, Hypertext Transport Protocol, and Hypertext Markup Language.

Neil Savage

Pages 20-22

Big Data

2014 ACM A.M. Turing

Award recipient Michael Stonebraker, 2013 ACM Prize recipient David Blei, 2007 ACM Prize recipient Daphne Koller, and ACM Fellow Vipin Kumar discuss trends in big data.

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COLUMN: INSIDE RISKS

Trustworthiness and Truthfulness Are Essential

Their absence can introduce huge risks . . .

Peter G. Neumann

Pages 26-28

COLUMN: BROADENING

PARTICIPATION

The Influence and Promise of Alliances

Evaluating the influence of broadening participation efforts on students, faculty, organizations, and the computing education infrastructure.

Leslie Goodyear, Gary Silverstein, Linda P. Thurston

Pages 29-30

COLUMN: KODE VICIOUS

Forced Exception Handling

You can never discount the human element in programming.

George V. Neville-Neil

Pages 31-32

COLUMN: VIEWPOINT

Remaining Trouble Spots with Computational Thinking

Addressing unresolved questions concerning computational thinking.

Peter J. Denning

Pages 33-39

SECTION: PRACTICE

The Debugging Mind-Set

Understanding the psychology of learning strategies leads to effective problem-solving skills.

Devon H. O'Dell

Pages 40-45

Too Big NOT to Fail

Embrace failure so it does not embrace you.

Pat Helland, Simon Weaver, Ed Harris

Pages 46-50

Conversations with Technology

Leaders: Erik Meijer

Great engineers are able to maximize their mental power.

Kate Matsudaira, Erik Meijer

Pages 51-54

SECTION: CONTRIBUTED

ARTICLES

The SCION Internet Architecture

Adhering to the end-to-end principle even more than the current Internet yields highly available point-to-point communication.

David Barrera, Laurent Chuat, Adrian Perrig, Raphael M. Reischuk, Pawel Szalachowski

Pages 56-65

The Dynamics of Work-Family

Conflict

Conflict is averted by separating work and family time and responsibility, as reflected in millions of tweets.

Yili Liu, Lina Zhou

Pages 66-70

SECTION: REVIEW

ARTICLES

Learnable Programming: blocks and beyond

New blocks frameworks open doors to greater experimentation for novices and professionals alike.

David Bau, Jeff Gray, Caitlin Kelleher, Josh Sheldon, Franklyn Turbak

Pages 72-80

SECTION: RESEARCH

HIGHLIGHTS

Technical Perspective: What Led Computer Vision to Deep Learning?

We are in the middle of the third wave of interest in artificial neural networks as the leading paradigm for machine learning. "ImageNet Classification with Deep Convolutional Neural Networks" is the paper most responsible for ...

Jitendra Malik

Pages 82-83

ImageNet Classification with

Deep Convolutional Neural Networks

In the 1980s backpropagation did not live up to the very high expectations of its advocates. Twenty years later, we know what went wrong: for deep neural networks to shine, they need far more labeled data and hugely more computation ...

Alex Krizhevsky, Ilya Sutskever, Geoffrey E. Hinton

Pages 84-90

Technical Perspective: Low-

depth Arithmetic Circuits

The past few years have seen a revolution in our understanding of arithmetic circuits. "Unexpected Power of Low-Depth Arithmetic Circuits" by Gupta et al. on the "chasm at depth 3" is one of the culminations of this new understanding ...

Avi Wigderson

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Unexpected Power of Low-

Depth Arithmetic Circuits

Several earlier results have shown that it is possible to rearrange basic computational elements in surprising ways to give more efficient algorithms. The main result of this article is along a similar vein.

Ankit Gupta, Pritish Kamath, Neeraj Kayal, Ramprasad Saptharishi

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COLUMN: LAST BYTE

This Is for Everyone

Sir Tim Berners-Lee on the formative years of the world wide web, and the challenges it now faces.

Leah Hoffmann

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