

DEPARTMENT: EDITOR'S LETTER

Computing Is the Secret Ingredient (well, not so secret)

Computer science is both a powerful enabler of rapid advances in all intellectual fields and a disruptor driving furious revolutions in commerce and society worldwide.

Andrew A. Chien

Page 5

DEPARTMENT: LETTERS

TO THE EDITOR

Start CS Students Off with Industry Best Practices

Lamenting that CS students are often not exposed to best practices in the classroom, Thomas A. Limoncelli offered advice for serving students better in "Four Ways to Make CS and IT More Immersive" (Oct. 2017). We agree with that ...

CACM Staff

Page 6

DEPARTMENT: CERF'S UP

Now for Something Entirely Different

This column is about three books I have just read. Two get at the proliferation of wrong but persuasive assertions about the past, present, or future. The third appeals to logic and humility.

Vinton G. Cerf

Page 7

DEPARTMENT:

BLOG@CACM

Building Tools to Help Students Learn to Program

Philip Guo summarizes his first three years of research into building tools to support those learning computer programming.

Philip Guo

Pages 8-9

COLUMN: NEWS

Perovskites Boost Solar-Cell Potential

New materials could allow cheaper, more efficient solar cells for both traditional and novel applications.

Don Monroe

Pages 11-13

Gaming Machine Learning

Game simulations are driving improvements in machine learning for autonomous vehicles and other devices.

Samuel Greengard

Pages 14-16

Parallel Computational

Thinking

Applications must be programmed to process instructions in parallel to take full advantage of the new multicore processors.

Keith Kirkpatrick

Pages 17-19

COLUMN: THE

PROFESSION OF IT

The Forgotten Engineer

Engineering has been marginalized by the unhealthy belief that engineering is the application of science.

Peter J. Denning
Pages 20-23

COLUMN: BROADENING

PARTICIPATION

Community Colleges: A Resource for Increasing Equity and Inclusion in Computer Science Education

Challenging a simplistic pathway metaphor.

Louise Ann Lyon, Jill Denner

Pages 24-26

COLUMN: KODE VICIOUS

Cold, Hard Cache

On the implementation and maintenance of caches.

George V. Neville-Neil

Pages 27-28

COLUMN: VIEWPOINT

The Death of Big Software

We are past the tipping point in the transition away from 20th-century big software architectures.

Stephen J. Andriole

Pages 29-32

Lousy Advice to the Lovelorn

The 37% rule is rarely applicable in real-world situations. It is certainly entirely wrong-headed as advice for getting married.

Ernest Davis

Pages 33-35

SECTION: PRACTICE

Bitcoin's Academic Pedigree

The concept of cryptocurrencies is built from forgotten ideas in research literature.

Arvind Narayanan, Jeremy Clark

Pages 36-45

XML and JSON Are Like

Cardboard

Cardboard surrounds and protects stuff as it crosses boundaries.

Pat Helland

Pages 46-47

Research for Practice: Vigorous

Public Debates in Academic Computer Science

Expert-curated guides to the best of CS research.

John Regehr, Peter Bailis

Pages 48-50

SECTION: CONTRIBUTED

ARTICLES

Cybersecurity, Nuclear Security, Alan Turing, and Illogical Logic

Cyber deterrence, like nuclear deterrence, depends on our adversaries being rational enough to be deterred by our threats but us not by theirs.

Technology- Driven Changes in

Work and Employment

Even when surrounded by ubiquitous computing, humans should be encouraged to do what they do better than machines.

Ramiro Montealegre, Wayne F. Cascio

Pages 60-67

SECTION: REVIEW

ARTICLES

Energy Efficiency: A New Concern for Application Software Developers

Development of energy-efficient software is hindered by a lack of knowledge and a lack of tools.

Gustavo Pinto, Fernando Castor

Pages 68-75

SECTION: RESEARCH

HIGHLIGHTS

Technical Perspective: Pricing Information (and Its Implications)

"A Theory of Pricing Private Data," by Chao Li, *et al.*, introduces a fascinating and complicated issue that arises on the buy-side of the market when buyers are interested in multiple linear functions of the same dataset.

Aaron Roth

Page 78

A Theory Of Pricing Private

Data

We describe the foundations of a market in which those seeking access to data must pay for it and individuals are compensated for the loss of privacy they may suffer.

Chao Li, Daniel Yang Li, Gerome Miklau, Dan Suciu

Pages 79-86

Technical Perspective: A

Simple, Elegant Approach to Non-Numeric Parallelization

"Automatically Accelerating Non-Numerical Programs by Architecture-Compiler Co-Design," by Simone Campanoni, *et al.*, proposes a modest hardware extension to support a new parallel execution model for small, non-numeric loops. ...

James Larus

Page 87

Automatically Accelerating Non-

Numerical Programs by Architecture-Compiler Co-Design

HELIX-RC is a compiler/microprocessor co-design that opens loops to parallelization by decoupling communication from thread execution in conventional multicore architectures.

Simone Campanoni, Kevin Brownell, Svilen Kanev, Timothy M. Jones, Gu-Yeon Wei, David Brooks

Pages 88-97

COLUMN: LAST BYTE

Grooming the Leaders of Tomorrow

Former Stanford University president John Hennessy is the academic architect behind the Knight-Hennessy Scholars Program.

