SPECIAL SECTION
Dealing with Data

INTRODUCTION
692 Challenges and Opportunities

NEWS
694 Rescue of Old Data Offers Lesson for Particle Physicists
696 Is There an Astronomer in the House?
698 May the Best Analyst Win

PERSPECTIVES
700 Climate Data Changes in the 21st Century
J. T. Overpeck et al.
>> Science Podcast
703 Challenges and Opportunities of Open Data in Ecology
O. J. Reichman et al.
705 Changing the Equation on Scientific Data Visualization
P. Fox and J. Hendler
708 Challenges and Opportunities in Mining Neuroscience Data
H. Akil et al.

712 The Disappearing Third Dimension
T. L. Rowe and L. R. Frank
714 Advancing Global Health Research Through Digital Technology and Sharing Data
T. Lang
R. G. Baraniuk
719 Ensuring the Data-Rich Future of the Social Sciences
G. King
721 Metaknowledge
J. A. Evans and J. G. Foster
725 Access to Stem Cells and Data: Persons, Property Rights, and Scientific Progress
D. J. H. Mathews et al.
728 On the Future of Genomic Data
S. D. Kahn

660 The Genome Project: What Will It Do as a Teenager?
>> Genome Anniversary Essays p. 689
661 Ending Earmarks Also Means the End of Many Research Projects

NEWS FOCUS
662 HUMAN GENOME 10TH ANNIVERSARY
What Would You Do?
>> Science Podcast
666 Will Computers Crash Genomics?
>> Genome Anniversary Essays p. 689; Dealing with Data section p. 692
669 Coming Soon to a Lab Near You: Drag-and-Drop Virtual Worlds
>> Dealing with Data section p. 692

663 Undercutting the Grant Process
A. M. Gade
665 Assessing Performance Through Understanding
P. Cintas
666 Leading the Charge to Virtual Meetings
W. W. Dolci et al.
667 No Mystery About the Polio Outbreak
C. L. Crawford

674 CORRECTIONS AND CLARIFICATIONS

675 Disaster Deferred
S. Stein, reviewed by M. Hamburger
676 Atlas of Science
K. Börner, reviewed by M. A. Porter
>> Dealing with Data section p. 692

678 Measuring the Results of Science Investments
J. Lane and S. Bertuzzi
>> Dealing with Data section p. 692

681 The Eukaryotic Ribosome
V. Ramakrishnan
>> Research Article p. 730
682 Learning from Nature
J. O. Kephart
683 The Lives of Proteins
J. B. Plotkin
>> Report p. 764
685 The Genetics of Primary Aldosteronism
J. W. Funder
>> Report p. 768
686 Astronomy in the Time Domain
E. Bernardini
>> Reports pp. 736 and 739
687 Unusual Thermoelastic Properties of Methanol Monohydrate
J. N. Grima et al.
>> Report p. 742

649 Making Data Maximally Available
Brooks Hanson, Andrew Sugden, Bruce Alberts
>> Dealing with Data section p. 692

654 A roundup of the week’s top stories

658 Pfizer’s Shakeup Means Less Money for Research
659 From Nuclear Watchdog to the Maelstrom of Cairo

673 Undercutting the Grant Process
A. M. Gade
675 Disaster Deferred
S. Stein, reviewed by M. Hamburger
676 Atlas of Science
K. Börner, reviewed by M. A. Porter
>> Dealing with Data section p. 692

678 Measuring the Results of Science Investments
J. Lane and S. Bertuzzi
>> Dealing with Data section p. 692

681 The Eukaryotic Ribosome
V. Ramakrishnan
>> Research Article p. 730
682 Learning from Nature
J. O. Kephart
683 The Lives of Proteins
J. B. Plotkin
>> Report p. 764
685 The Genetics of Primary Aldosteronism
J. W. Funder
>> Report p. 768
686 Astronomy in the Time Domain
E. Bernardini
>> Reports pp. 736 and 739
687 Unusual Thermoelastic Properties of Methanol Monohydrate
J. N. Grima et al.
>> Report p. 742

CONTENTS continued >>
ESSAYS

689 Genome-Sequencing Anniversary: A Celebration of the Genome, Part II
My Genome
D. Tutu

Genome Literacy
E. T. Dermitzakis

Personal Genomics: For One and for All
J. Wang

The Landscape of Human Evolution
P. Sabeti

My Genome, My Identity, My Health
C. D. M. Royal

What Will Drive Genomics Over the Next 10 Years?
A. Caplan

An Anniversary Party
K. Stefánsson

First Steps on a Long Road
E. Schadt

>> News stories pp. 660, 662, and 666

RESEARCH ARTICLE

730 Crystal Structure of the Eukaryotic 40S Ribosomal Subunit in Complex with Initiation Factor 1
J. Rabl et al.
The structure provides insight into how protein synthesis is initiated and into the evolution of the eukaryotic ribosome.

>> Perspective p. 681

REPORTS

736 Discovery of Powerful Gamma-Ray Flares from the Crab Nebula
M. Tavani et al.

739 Gamma-Ray Flares from the Crab Nebula
A. A. Abdo et al.
Gamma-ray observations of the Crab Nebula by two different space telescopes challenge particle acceleration theory.

>> Perspective p. 686

742 Negative Linear Compressibility and Massive Anisotropic Thermal Expansion in Methanol Monohydrate
A. D. Fortes et al.
At low temperatures, a simple molecular crystal can shrink along one axis when heated and expand along it when compressed.

>> Perspective p. 687

746 Increasing Solar Absorption for Photocatalysis with Black Hydrogenated Titanium Dioxide Nanocrystals
X. Chen et al.
An amorphous surface layer on titanium dioxide nanoparticles creates electronic states that allow longer-wavelength photoexcitation.

750 Complete Fourth Metatarsal and Arches in the Foot of Australopithecus afarensis
C. V. Ward et al.
A long bone of the foot of an early human indicates that its foot was stiff and arched, as in modern humans.

753 Embryological Evidence Identifies Wing Digits in Birds as Digits 1, 2, and 3
K. Tamura et al.
Digit identities in living birds are the same as in three-fingered dinosaurs, in agreement with paleontological evidence.

757 Structure of MyTH4-FERM Domains in Myosin VIIa Tail Bound to Cargo
L. Wu et al.
Structural data suggest how mutations in a myosin tail cause deafness in humans.

760 HSPC117 Is the Essential Subunit of a Human tRNA Splicing Ligase Complex
J. Popow et al.
The human enzyme that joins transfer RNA exons together is discovered.

764 Proteome Half-Life Dynamics in Living Human Cells
E. Eden et al.
In times of stress, long-lived proteins increase their durability.

>> Perspective p. 685

768 K+ Channel Mutations in Adrenal Aldosterone-Producing Adenomas and Hereditary Hypertension
M. Choi et al.
Potassium channel mutations drive both cell growth and hormone production in an adrenal tumor that causes severe hypertension.

772 Retrieval Practice Produces More Learning than Elaborative Studying with Concept Mapping
J. D. Karpicke and J. R. Blunt
Two different ways of thinking through texts are compared for learning value.

775 Leishmania RNA Virus Controls the Severity of Mucocutaneous Leishmaniasis
A. Ives et al.
An RNA virus of a parasite binds to human Toll-like receptor 3 and modulates host immune responses to the parasite.

778 Posttranslational Modification of Pili upon Cell Contact Triggers N. meningitidis Dissemination
J. Chamot-Rooke et al.
Regulated deaggregation allows meningitis-causing bacteria to propagate to new host cells and migrate across epithelia.
Surprising Nature of Granular Materials

A simple physics experiment highlights the surprising nature of granular materials. http://scim.ag/sand-trick

Geologists Rediscover a Natural Wonder Drowned for Over a Century

New Zealand’s Lost-and-Found Pink Terraces http://scim.ag/pink-terrace

Computer analysis allows researchers to reconstruct pre-photography faces.

What Did George Washington Really Look Like?

The process by which animal cells are physically separated after cell division is dissected in molecular detail.

Dynamic Control of Chiral Space in a Catalytic Asymmetric Reaction Using a Molecular Motor

A crystal structure illuminates reciprocal regulation between a G protein and its effector.

Research Article: Power to the People—Participant Ownership of Clinical Trial Data

Policy-makers, researchers, and information technology leaders can help transform how we protect and use patient data.

Different B Cell Populations Mediate Early and Late Memory During an Endogenous Immune Response

A cell enrichment technique reveals the dynamics of the endogenous memory B cell response.

Tomography of Reaction-Diffusion Microemulsions Reveals Three-Dimensional Turing Patterns

Tomography reveals three-dimensional Turing patterns created by the Belousov-Zhabotinsky reaction running in a microemulsion.

Differentiation of ESCRT–III–Dependent Filaments

A model of pseudopod formation, splitting, and persistence describe how cells migrate.

What Did George Washington Really Look Like?

A crystal structure illuminates reciprocal regulation between a G protein and its effector.

Research Article: Power to the People—Participant Ownership of Clinical Trial Data

Policy-makers, researchers, and information technology leaders can help transform how we protect and use patient data.

Different B Cell Populations Mediate Early and Late Memory During an Endogenous Immune Response

A cell enrichment technique reveals the dynamics of the endogenous memory B cell response.

Tomography of Reaction-Diffusion Microemulsions Reveals Three-Dimensional Turing Patterns

Tomography reveals three-dimensional Turing patterns created by the Belousov-Zhabotinsky reaction running in a microemulsion.

Dynamic Control of Chiral Space in a Catalytic Asymmetric Reaction Using a Molecular Motor

A crystal structure illuminates reciprocal regulation between a G protein and its effector.

Research Article: Power to the People—Participant Ownership of Clinical Trial Data

Policy-makers, researchers, and information technology leaders can help transform how we protect and use patient data.

Different B Cell Populations Mediate Early and Late Memory During an Endogenous Immune Response

A cell enrichment technique reveals the dynamics of the endogenous memory B cell response.

Tomography of Reaction-Diffusion Microemulsions Reveals Three-Dimensional Turing Patterns

Tomography reveals three-dimensional Turing patterns created by the Belousov-Zhabotinsky reaction running in a microemulsion.

Dynamic Control of Chiral Space in a Catalytic Asymmetric Reaction Using a Molecular Motor

A crystal structure illuminates reciprocal regulation between a G protein and its effector.

Research Article: Power to the People—Participant Ownership of Clinical Trial Data

Policy-makers, researchers, and information technology leaders can help transform how we protect and use patient data.

Different B Cell Populations Mediate Early and Late Memory During an Endogenous Immune Response

A cell enrichment technique reveals the dynamics of the endogenous memory B cell response.

Tomography of Reaction-Diffusion Microemulsions Reveals Three-Dimensional Turing Patterns

Tomography reveals three-dimensional Turing patterns created by the Belousov-Zhabotinsky reaction running in a microemulsion.

Dynamic Control of Chiral Space in a Catalytic Asymmetric Reaction Using a Molecular Motor

A crystal structure illuminates reciprocal regulation between a G protein and its effector.

Research Article: Power to the People—Participant Ownership of Clinical Trial Data

Policy-makers, researchers, and information technology leaders can help transform how we protect and use patient data.

Different B Cell Populations Mediate Early and Late Memory During an Endogenous Immune Response

A cell enrichment technique reveals the dynamics of the endogenous memory B cell response.

Tomography of Reaction-Diffusion Microemulsions Reveals Three-Dimensional Turing Patterns

Tomography reveals three-dimensional Turing patterns created by the Belousov-Zhabotinsky reaction running in a microemulsion.

Dynamic Control of Chiral Space in a Catalytic Asymmetric Reaction Using a Molecular Motor

A crystal structure illuminates reciprocal regulation between a G protein and its effector.

Research Article: Power to the People—Participant Ownership of Clinical Trial Data

Policy-makers, researchers, and information technology leaders can help transform how we protect and use patient data.

Different B Cell Populations Mediate Early and Late Memory During an Endogenous Immune Response

A cell enrichment technique reveals the dynamics of the endogenous memory B cell response.

Tomography of Reaction-Diffusion Microemulsions Reveals Three-Dimensional Turing Patterns

Tomography reveals three-dimensional Turing patterns created by the Belousov-Zhabotinsky reaction running in a microemulsion.

Dynamic Control of Chiral Space in a Catalytic Asymmetric Reaction Using a Molecular Motor

A crystal structure illuminates reciprocal regulation between a G protein and its effector.

Research Article: Power to the People—Participant Ownership of Clinical Trial Data

Policy-makers, researchers, and information technology leaders can help transform how we protect and use patient data.

Different B Cell Populations Mediate Early and Late Memory During an Endogenous Immune Response

A cell enrichment technique reveals the dynamics of the endogenous memory B cell response.

Tomography of Reaction-Diffusion Microemulsions Reveals Three-Dimensional Turing Patterns

Tomography reveals three-dimensional Turing patterns created by the Belousov-Zhabotinsky reaction running in a microemulsion.

Dynamic Control of Chiral Space in a Catalytic Asymmetric Reaction Using a Molecular Motor

A crystal structure illuminates reciprocal regulation between a G protein and its effector.

Research Article: Power to the People—Participant Ownership of Clinical Trial Data

Policy-makers, researchers, and information technology leaders can help transform how we protect and use patient data.