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.
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. 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

730 The Genome Project: What Will It Do as a Teenager?
T. J. Hubbard and L. R. Frank
733 Ending Earmarks Also Means the End of Many Research Projects
J. T. Overpeck et al.

732 Challenges and Opportunities of Open Data in Ecology
O. J. Reichman et al.
736 Changing the Equation on Scientific Data Visualization
P. Fox and J. Hendler
739 Challenges and Opportunities in Mining Neuroscience Data
H. Akil et al.

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

LETTERS
673 Undercutting the Grant Process
A. M. Gade
675 Assessing Performance Through Understanding
P. Cintas
676 Leading the Charge to Virtual Meetings
W. D. Dolci et al.
677 No Mystery About the Polio Outbreak
C. L. Crawford

CORRECTIONS AND CLARIFICATIONS
678 Measuring the Results of Science Investments
J. Lane and S. Bertuzzi

PERSPECTIVES
681 The Eukaryotic Ribosome
V. Ramakrishnan
685 The Lives of Proteins
J. B. Plotkin
687 The Genetics of Primary Aldosteronism
J. W. Funder

682 Learning from Nature
J. O. Kephart
686 Astronomy in the Time Domain
E. Bernardini

683 Unusual Thermoelastic Properties of Methanol Monohydrate
J. N. Grima et al.

LETTERS
673 Undercutting the Grant Process
A. M. Gade
675 Assessing Performance Through Understanding
P. Cintas
676 Leading the Charge to Virtual Meetings
W. D. Dolci et al.
677 No Mystery About the Polio Outbreak
C. L. Crawford

POLICY FORUM
678 Measuring the Results of Science Investments
J. Lane and S. Bertuzzi

PERSPECTIVES
681 The Eukaryotic Ribosome
V. Ramakrishnan
685 The Lives of Proteins
J. B. Plotkin
687 The Genetics of Primary Aldosteronism
J. W. Funder

682 Learning from Nature
J. O. Kephart
686 Astronomy in the Time Domain
E. Bernardini

683 Unusual Thermoelastic Properties of Methanol Monohydrate
J. N. Grima et al.

682 Learning from Nature
J. O. Kephart
686 Astronomy in the Time Domain
E. Bernardini

683 Unusual Thermoelastic Properties of Methanol Monohydrate
J. N. Grima et al.

682 Learning from Nature
J. O. Kephart
686 Astronomy in the Time Domain
E. Bernardini

683 Unusual Thermoelastic Properties of Methanol Monohydrate
J. N. Grima et al.

682 Learning from Nature
J. O. Kephart
686 Astronomy in the Time Domain
E. Bernardini

683 Unusual Thermoelastic Properties of Methanol Monohydrate
J. N. Grima et al.

682 Learning from Nature
J. O. Kephart
686 Astronomy in the Time Domain
E. Bernardini

683 Unusual Thermoelastic Properties of Methanol Monohydrate
J. N. Grima et al.

682 Learning from Nature
J. O. Kephart
686 Astronomy in the Time Domain
E. Bernardini

683 Unusual Thermoelastic Properties of Methanol Monohydrate
J. N. Grima et al.

682 Learning from Nature
J. O. Kephart
686 Astronomy in the Time Domain
E. Bernardini

683 Unusual Thermoelastic Properties of Methanol Monohydrate
J. N. Grima et al.

682 Learning from Nature
J. O. Kephart
686 Astronomy in the Time Domain
E. Bernardini

683 Unusual Thermoelastic Properties of Methanol Monohydrate
J. N. Grima et al.
ESSAYS
689 Genome-Sequencing Anniversary: A Celebration of the Genome, Part II
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 Titan 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-ERM Domains in Myosin V1a 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.
>> Perspective p. 685
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.
SCIENCE SIGNALING
www.sciencesignaling.org
The Signal Transduction Knowledge Environment
8 February Issue: http://scim.ag/ss020811

RESEARCH ARTICLE: The Crystal Structure of a Self-Activating G Protein α Subunit Reveals Its Distinct Mechanism of Signal Initiation
J. C. Jones et al.
The Arabidopsis G protein α subunit exhibits properties necessary and sufficient for receptor-independent activation.

PERCEPTIVE: Gαi and Phospholipase C-β—
Turn On, Turn Off, and Do It Fast
E. M. Ross
A crystal structure illuminates reciprocal regulation between a G protein and its effector.

PERCEPTIVE: How Cells Use Pseudopods for Persistent Movement and Navigation
P. J. M. Van Hoestert
A model of pseudopod formation, splitting, and persistence describe how cells migrate.

GLOSSARY
Find out what MAX, FRK, and TIMP mean in the world of cell signaling.

SCIENCE TRANSLATIONAL MEDICINE
www.sciencetranslationalmedicine.org
Integrating Medicine and Science
9 February Issue: http://scim.ag/stm020911

COMMENTARY: Power to the People—Participant Ownership of Clinical Trial Data
S. F. Terry and P. F. Terry
The time has come to crowd-source data for diagnostic and therapeutics development.

COMMENTARY: Electronic Consent Channels—Preserving Patient Privacy Without Handcuffing Researchers
R. H. Shelton
Policy-makers, researchers, and information technology leaders can help transform how we protect and use patient data.

RESEARCH ARTICLE: Photodynamic Ablation of Lymphatic Vessels and Intralymphatic Cancer Cells Prevents Metastasis
T. Tammela et al.
Photodynamic therapy suppresses metastasis by eradicating both the in-transit tumor cells and their conduit to distant tissues.

RESEARCH ARTICLE: 5-Lipoxygenase Metabolite 4-HDHA Is a Mediator of the Antiangiogenic Effect of α-3 Polyunsaturated Fatty Acids
P. Sapieha et al.
In mice, certain fatty acids in the diet are converted to a metabolite that blocks destructive vessel growth similar to diabetic retinopathy.

SCIENCE CAREERS
www.sciencemag.org/career_magazine
Free Career Resources for Scientists

More Than Words: Biomedical Ontologies Provide New Scientific Opportunities
C. Wald
Biomedical ontology is growing as an informatics specialty, and ontologies are proving to be powerful software and data-mining tools.

Surfing the Tsunami
E. Park
Scientists in many disciplines need informatics and computational skills to exploit the increasingly vast quantities of available data.

Sharing Data in Biomedical and Clinical Research
K. Travis
It's not always clear how or where to share raw data, particularly when it includes patient information.

SCIENCEPODCAST
www.sciencemag.org/multimedia/podcast
Free Weekly Show
Download the 11 February Science Podcast to hear about genomic and climate data challenges, the world's data capacity, and more.

SCIENCE INSIDER
news.sciencemag.org/scienceinsider
Science Policy News and Analysis

SPECIAL SERIES
http://scim.ag/genome10
Human Genome 10th Anniversary
A special month-long series explores the impacts of the genomics revolution on science and society.
Science 331 (6018), 647-783.