

NEWS

IN BRIEF

244 Roundup of the week's news

IN DEPTH

247 ALARM OVER BIOSAFETY BLUNDERS

Lapses stoke debate about flu virus research *By J. Cohen*

248 A RADICAL CHANGE IN PEER REVIEW

Each NSF applicant evaluated seven competing proposals *By J. Mervis*

249 PROTEINS AND A PREGNANCY WOE

Surprising insight into preeclampsia may offer early warning for at-risk women *By N. Whitehead*

► SCIENCE TRANSLATIONAL MEDICINE

RESEARCH ARTICLE BY I. A. BUHIMSCHI ET AL.

250 RESEARCHERS AIM FOR AN ELECTRICAL MEMORY PROSTHESIS

DARPA-funded effort to develop implants for traumatic brain injuries draws skepticism *By E. Underwood*

251 HARVEST OF GENOME DATA FOR WHEAT GROWERS

DNA survey puts wheat genes in order, in a step toward a full sequence *By E. Pennisi*

► SLICING THE WHEAT GENOME SECTION P. 285



252 & 254

FEATURES

252 THE ELUSIVE HEART FIX

Researchers still don't agree whether cell infusions rejuvenate the heart *By J. Couzin-Frankel*

254 Top heart lab comes under fire

By K. Servick

INSIGHTS

BOOKS ET AL.

258 SUMMER READING

Eight book reviews from postdocs and grad students

PERSPECTIVES

264 THE FUTURE LIES IN UNCERTAINTY

Sophisticated statistical insights are crucial for gaining knowledge from ever-larger data sets *By D. J. Spiegelhalter*

265 MIND THE MIDZONE

Is the separation of chromosomes during cell division monitored by a checkpoint?

By M. A. Hadders and S. M. A. Lens

► REPORT P. 332

267 CHARGE TRANSFER GOES THE DISTANCE

Electronic relaxation following x-ray excitation illuminates steps in molecular dissociation *By S. T. Pratt*

► REPORT P. 288

268 IMPROVING CARDIAC RHYTHM WITH A BIOLOGICAL PACEMAKER

Heart muscle cells in a large animal model are reprogrammed to restore heart rate and function *By N. V. Munshi and E. N. Olson*

► SCIENCE TRANSLATIONAL MEDICINE
RESEARCH ARTICLE BY Y.-F. HU ET AL.

270 CREATING ANTIOXIDANTS BY OXIDATION CATALYSIS

A key component of vitamin E can be synthesized without use of expensive transition metal catalysts

By B. J. Nachtsheim

► REPORT P. 291

271 ONE, TWO, THREE, CYTOPLASMIC DYNEIN IS GO!

The dynein motor protein must be part of a three-way complex to be fully active *By V. Allan*

► REPORT P. 337

272 QUANTUM SYSTEMS UNDER CONTROL

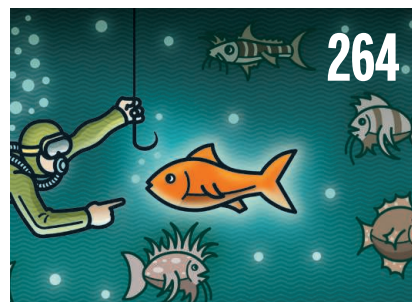
Optical trapping enables the building of quantum matter one atom at a time

By J. Thompson and M. D. Lukin

► REPORT P. 306

274 NIH ROADMAP/Common Fund AT 10 YEARS

A mechanism for funding biomedical research at NIH that transcends Institute and Center boundaries is bearing fruit *By F. S. Collins et al.*



277 WALTER GEHRING (1939–2014)

A brief reflection on the life and lab of a preeminent developmental biologist

By M. Levine

LETTERS

278 PARTNERING WITH CUBA: WEATHER EXTREMES

By J. C. Antuña Marrero et al.

278 PARTNERING WITH CUBA: EARTHQUAKE HAZARDS

By R. S. Yeats

278 DELISTED WHALES GOOD NEWS FOR PIPELINE

By J. J. Alava and J. N. Silberg

279 OUTSIDE THE TOWER: A NIGHT AT THE MUSEUM

By A. de Morrée

► EDITORIAL P. 243

DEPARTMENTS

243 EDITORIAL

Science advocacy, defined

By Joanne Padrón Carney

► OUTSIDE THE TOWER P. 279

350 WORKING LIFE

Tell the negative committee to shut up

By Fanuel Mwindi

Science Staff	242
New Products	343
Science Careers	345



RESEARCH

IN BRIEF

280 From *Science* and other journals

REVIEW

283 ORGANOID GENERATION

Organogenesis in a dish: Modeling development and disease using organoid technologies

M. A. Lancaster and J. A. Knoblich

REVIEW SUMMARY; FOR FULL TEXT:
dx.doi.org/10.1126/science.1247125

REPORTS

288 ULTRAFast DYNAMICS

Imaging charge transfer in iodomethane upon x-ray photoabsorption *B. Erk et al.*

► PERSPECTIVE P. 267

291 ASYMMETRIC CATALYSIS

High-turnover hypoidite catalysis for asymmetric synthesis of tocopherols

M. Uyanik et al.

► PERSPECTIVE P. 270

295 PHOTOVOLTAICS

A hole-conductor-free, fully printable mesoscopic perovskite solar cell with high stability *A. Mei et al.*

298 APPLIED OPTICS

Dielectric gradient metasurface optical elements *D. Lin et al.*

302 QUANTUM COMPUTING

Quantum computations on a topologically encoded qubit *D. Nigg et al.*

306 QUANTUM MECHANICS

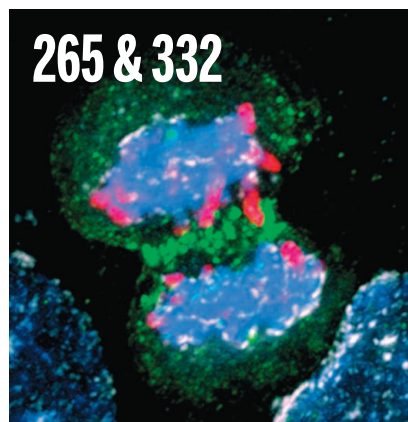
Two-particle quantum interference in tunnel-coupled optical tweezers

A. M. Kaufman et al.

► PERSPECTIVE P. 272

309 OPTICAL METROLOGY

Electro-optical frequency division and stable microwave synthesis *J. Li et al.*



313 ASSOCIATIVE LEARNING

Role of synaptic phosphatidylinositol 3-kinase in a behavioral learning response in *C. elegans* *H. Ohno et al.*

318 PALEOCEANOGRAPHY

Thermohaline circulation crisis and impacts during the mid-Pleistocene transition *L. D. Pena and S. L. Goldstein*

322 OCEANOGRAPHY

Oceanic mass transport by mesoscale eddies *Z. Zhang et al.*

325 FOOD SECURITY

Leverage points for improving global food security and the environment

P. C. West et al.

328 ALTERNATIVE SPLICING

Human tRNA synthetase catalytic nulls with diverse functions *W.-S. Lo et al.*

332 CELL DIVISION

Feedback control of chromosome separation by a midzone Aurora B gradient *O. Afonso et al.*

► PERSPECTIVE P. 265

337 MOLECULAR MOTORS

Activation of cytoplasmic dynein motility by dynactin-cargo adapter complexes *R. J. McKenney et al.*

► PERSPECTIVE P. 271

SPECIAL SECTION

Slicing the wheat genome

INTRODUCTION

285 Slicing the wheat genome
K. Eversole et al.

RESEARCH ARTICLE ABSTRACTS

286 A chromosome-based draft sequence of the hexaploid bread wheat (*Triticum aestivum*) genome *The International Wheat Genome Sequencing Consortium (IWGSC)*

Ancient hybridizations among the ancestral genomes of bread wheat
T. Marcussen et al.

Genome interplay in the grain transcriptome of hexaploid bread wheat *M. Pfeifer et al.*

Structural and functional partitioning of bread wheat chromosome 3B
F. Choulet et al.

SEE ALSO

► NEWS STORY P. 251

► sciencemag.org/extra/wheatgenome

ON THE COVER



Red winter wheat (*Triticum aestivum* L.) growing on a farm in Idaho. As one of the largest sources of nutrition for humanity worldwide, the sequencing of its large, complex genome illuminates wheat's evolutionary history and breeding potential. See pages 251 and 285 and sciencemag.org/extra/wheatgenome. *Photo: Mark Thiessen*

Science

345 (6194)

Science **345** (6194), 243-350.

ARTICLE TOOLS

<http://science.sciencemag.org/content/345/6194>

PERMISSIONS

<http://www.sciencemag.org/help/reprints-and-permissions>

Use of this article is subject to the [Terms of Service](#)

Science (print ISSN 0036-8075; online ISSN 1095-9203) is published by the American Association for the Advancement of Science, 1200 New York Avenue NW, Washington, DC 20005. The title *Science* is a registered trademark of AAAS.

Copyright © 2014 The Authors, some rights reserved; exclusive licensee American Association for the Advancement of Science. No claim to original U.S. Government Works.