



Cover image: Pictured is a computer-generated atomic model of a protein scaffolding system. Small proteins, such as those found throughout a cell, are not amenable to detailed analysis by cryo-electron microscopy (cryo-EM). Yuxi Liu et al. designed a self-assembling protein scaffolding system that enables the analysis of small proteins by cryo-EM. Using the scaffolding system, the authors visualized the structure of a small protein in near-atomic detail, potentially enabling the visualization of cellular proteins by cryo-EM. See the article by Liu et al. on pages 3362–3367. Image courtesy of Shane Gonen.

From the Cover

- 3362 Cryo-electron microscopy of small proteins
 E2970 Predicting cancer outcomes
 3261 Human activity and Holocene rainforests in Africa
 3356 } Reconstruction of bacterial actin-like protein
 3458 }
 3392 Medulloblastoma in the lateral cerebellum

Contents

THIS WEEK IN PNAS

3193 In This Issue

LETTERS (ONLINE ONLY)

- E2902 Listen to the whisper of the rocks, telling their ancient story
Paul J. Hearty and Blair R. Tormey
- E2904 Reply to Hearty and Tormey: Use the scientific method to test geologic hypotheses, because rocks do not whisper
Alessio Rovere, Elisa Casella, Daniel L. Harris, Thomas Lorscheid, Napayalage A. K. Nandasena, Blake Dyer, Michael R. Sandstrom, Paolo Stocchi, William J. D'Andrea, and Maureen E. Raymo
- E2906 Structure of the catalytic F₁ head of the F₁-F_o ATP synthase from *Trypanosoma brucei*
Karen M. Davies and Werner Kühlbrandt
- E2908 Progesterone activation of zebrafish mineralocorticoid receptor may influence growth of some transplanted tumors
Yoshinao Katsu and Michael E. Baker
- E2910 Reply to Katsu and Baker: Using zebrafish PDX to screen drug sensitivity of endocrine-dependent cancers
Rita Fior and Miguel Godinho Ferreira

NEWS FEATURE—An in-depth look at trending science issues

- 3196 What happens when lab animals go wild
Carolyn Beans

COMMENTARIES

- 3200 Toward new design principles for superior gene silencing
Rangaramanujam M. Kannan
 → See companion article on page E2696 in issue 12 of volume 115
- 3202 Ancient deforestation in the green heart of Africa
Yadvinder Malhi
 → See companion article on page 3261
- 3205 The complex simplicity of the bacterial cytoskeleton
Felipe Merino and Stefan Raunser
 → See companion articles on pages 3356 and 3458

PNAS PLUS

3207 Significance Statements

Brief statements written by the authors about the significance of their papers.

PERSPECTIVE

3210 History meets palaeoscience: Consilience and collaboration in studying past societal responses to environmental change

John Haldon, Lee Mordechai, Timothy P. Newfield, Arlen F. Chase, Adam Izdebski, Piotr Guzowski, Inga Labuhn, and Neil Roberts

PHYSICAL SCIENCES

APPLIED PHYSICAL SCIENCES

3219 Correlation analysis framework for localization-based superresolution microscopy

Joerg Schnitzbauer, Yina Wang, Shijie Zhao, Matthew Bakalar, Tulip Nuwal, Baohui Chen, and Bo Huang

3225 Detection of amyloid fibrils in Parkinson's disease using plasmonic chirality

Jatish Kumar, Hasier Eraña, Elena López-Martínez, Nathalie Claes, Víctor F. Martín, Diego M. Solís, Sara Bals, Aitziber L. Cortajarena, Joaquín Castilla, and Luis M. Liz-Marzán

3308 Measuring discursive influence across scholarship

Aaron Gerow, Yuening Hu, Jordan Boyd-Graber, David M. Blei, and James A. Evans

BIOPHYSICS AND COMPUTATIONAL BIOLOGY

E2970 Predicting cancer outcomes from histology and genomics using convolutional networks

Pooya Mobadersany, Safoora Yousefi, Mohamed Amgad, David A. Gutman, Jill S. Barnholtz-Sloan, José E. Velázquez Vega, Daniel J. Brat, and Lee A. D. Cooper

3231 Simple mechanosense and response of cilia motion reveal the intrinsic habits of ciliates

Takuya Ohmura, Yukinori Nishigami, Atsushi Taniguchi, Shigenori Nonaka, Junichi Manabe, Takuji Ishikawa, and Masatoshi Ichikawa

3237 Structural changes of TasA in biofilm formation of *Bacillus subtilis*

Anne Diehl, Yvette Roske, Linda Ball, Anup Chowdhury, Matthias Hiller, Noel Molière, Regina Kramer, Daniel Stöppler, Catherine L. Worth, Brigitte Schlegel, Martina Leidert, Nils Cremer, Natalja Erdmann, Daniel Lopez, Heike Stephanowitz, Eberhard Krause, Barth-Jan van Rossum, Peter Schmieder, Udo Heinemann, Kürşad Turgay, Ümit Akbey, and Hartmut Oschkinat

3243 Direct observation of ultrafast large-scale dynamics of an enzyme under turnover conditions

Haim Yuval Aviram, Menahem Pirchi, Hisham Mazal, Yoav Barak, Inbal Riven, and Gilad Haran

3344 Phosphorylation-induced unfolding regulates p19^{INK4d} during the human cell cycle

Amit Kumar, Mohanraj Gopalswamy, Annika Wolf, David J. Brockwell, Mechthild Hatzfeld, and Jochen Balbach

3350 Substrate recognition and mechanism revealed by ligand-bound polyphosphate kinase 2 structures

Alice E. Parnell, Silja Mordhorst, Florian Kemper, Mariacarmela Giurrandino, Josh P. Prince, Nikola J. Schwarzer, Alexandre Hofer, Daniel Wohlwend, Henning J. Jessen, Stefan Gerhardt, Oliver Einsle, Petra C. F. Oyston, Jennifer N. Andexer, and Peter L. Roach

3464 Stabilized supralinear network can give rise to bistable, oscillatory, and persistent activity

Nataliya Kraynyukova and Tatjana Tchumatchenko

CHEMISTRY

E2997 Combination of cGMP analogue and drug delivery system provides functional protection in hereditary retinal degeneration

Eleonora Vighi, Dragana Trifunović, Patricia Veiga-Crespo, Andreas Rentsch, Dorit Hoffmann, Ayse Sahaboglu, Torsten Strasser, Manoj Kulkarni, Evelina Bertolotti, Angélique van den Heuvel, Tobias Peters, Arie Reijkerk, Thomas Euler, Marius Ueffing, Frank Schwede, Hans-Gottfried Genieser, Pieter Gaillard, Valeria Marigo, Per Ekström, and François Paquet-Durand

3249 Immune-modulating enzyme indoleamine 2,3-dioxygenase is effectively inhibited by targeting its apo-form

Micah T. Nelp, Patrick A. Kates, John T. Hunt, John A. Newitt, Aaron Balog, Derrick Maley, Xiao Zhu, Lynn Abell, Alban Allentoff, Robert Borzilleri, Hal A. Lewis, Zeyu Lin, Steven P. Seitz, Chunhong Yan, and John T. Groves

3255 Cholesterol provides nonsacrificial protection of membrane lipids from chemical damage at air–water interface

Xinxing Zhang, Kevin M. Barraza, and J. L. Beauchamp

EARTH, ATMOSPHERIC, AND PLANETARY SCIENCES

3261 Early anthropogenic impact on Western Central African rainforests 2,600 y ago

Yannick Garcin, Pierre Deschamps, Guillemette Ménot, Geoffroy de Saulieu, Enno Schefuß, David Sebag, Lydie M. Dupont, Richard Oslisly, Brian Brademann, Kevin G. Mbusnum, Jean-Michel Onana, Andrew A. Ako, Laura S. Epp, Rik Tjallingii, Manfred R. Strecker, Achim Brauer, and Dirk Sachse

→ See Commentary on page 3202

PHYSICS

3267 Blindfold learning of an accurate neural metric

Christophe Gardella, Olivier Marre, and Thierry Mora

3273 Transitions from a Kondo-like diamagnetic insulator into a modulated ferromagnetic metal in FeGa_{3-y}Ge_y

Yao Zhang, Jie-Sheng Chen, Jie Ma, Jiamin Ni, Masaki Imai, Chishiro Michioka, Yuta Hadano, Marcos A. Avila, Toshiro Takabatake, Shiyuan Li, and Kazuyoshi Yoshimura

3279 Metastability and avalanche dynamics in strongly correlated gases with long-range interactions

Lorenz Hruby, Nishant Dogra, Manuele Landini, Tobias Donner, and Tilman Esslinger

3285 Universal linear and nonlinear electrostatics of a Dirac fluid

Zhiyuan Sun, Dmitry N. Basov, and Michael M. Fogler

SUSTAINABILITY SCIENCE

3290 Geospatial analysis of near-term potential for carbon-negative bioenergy in the United States

Ejeong Baik, Daniel L. Sanchez, Peter A. Turner, Katharine J. Mach, Christopher B. Field, and Sally M. Benson

3410 Climate warming enhances snow avalanche risk in the Western Himalayas

J. A. Ballesteros-Cánovas, D. Trappmann, J. Madrigal-González, N. Eckert, and M. Stoffel

SOCIAL SCIENCES

ANTHROPOLOGY

- 3428** **Four millennia of Iberian biomolecular prehistory illustrate the impact of prehistoric migrations at the far end of Eurasia**

Cristina Valdiosera, Torsten Günther, Juan Carlos Vera-Rodríguez, Irene Ureña, Eneko Iriarte, Ricardo Rodríguez-Varela, Luciana G. Simões, Rafael M. Martínez-Sánchez, Emma M. Svensson, Helena Malmström, Laura Rodríguez, José-María Bermúdez de Castro, Eudald Carbonell, Alfonso Alday, José Antonio Hernández Vera, Anders Götherström, José-Miguel Carretero, Juan Luis Arsuaga, Colin I. Smith, and Mattias Jakobsson

ECONOMIC SCIENCES

- 3296** **The Great Recession worsened blood pressure and blood glucose levels in American adults**

Teresa Seeman, Duncan Thomas, Sharon Stein Merkin, Kari Moore, Karol Watson, and Arun Karlamangla

ENVIRONMENTAL SCIENCES

- 3398** **Nitrate is an important nitrogen source for Arctic tundra plants**

Xue-Yan Liu, Keisuke Koba, Lina A. Koyama, Sarah E. Hobbie, Marissa S. Weiss, Yoshiyuki Inagaki, Gaius R. Shaver, Anne E. Giblin, Satoru Hobarra, Knute J. Nadelhoffer, Martin Sommerkorn, Edward B. Rastetter, George W. Kling, James A. Laundre, Yuriko Yano, Akiko Makabe, Midori Yano, and Cong-Qiang Liu

PSYCHOLOGICAL AND COGNITIVE SCIENCES

- 3302** **Psychopaths fail to automatically take the perspective of others**

Lindsey A. Drayton, Laurie R. Santos, and Arielle Baskin-Sommers

- 3470** **Towards an unconscious neural reinforcement intervention for common fears**

Vincent Taschereau-Dumouchel, Aurelio Cortese, Toshinori Chiba, J. D. Knotts, Mitsuo Kawato, and Hakwan Lau

SOCIAL SCIENCES

- 3308** **Measuring discursive influence across scholarship**

Aaron Gerow, Yuening Hu, Jordan Boyd-Graber, David M. Blei, and James A. Evans

SUSTAINABILITY SCIENCE

- 3314** **Rapid growth of the US wildland-urban interface raises wildfire risk**

Volker C. Radeloff, David P. Helmers, H. Anu Kramer, Miranda H. Mockrin, Patricia M. Alexandre, Avi Bar-Massada, Van Butsic, Todd J. Hawbaker, Sebastián Martinuzzi, Alexandra D. Syphard, and Susan I. Stewart

BIOLOGICAL SCIENCES

AGRICULTURAL SCIENCES

- E2911** **Cross-resistance to dicamba, 2,4-D, and fluroxypyr in *Kochia scoparia* is endowed by a mutation in an *AUX/IAA* gene**

Sherry LeClere, Chenxi Wu, Philip Westra, and R. Douglas Sammons

- 3320** **Regional pest suppression associated with widespread Bt maize adoption benefits vegetable growers**

Galen P. Dively, P. Dilip Venugopal, Dick Bean, Joanne Whalen, Kristian Holmstrom, Thomas P. Kuhar, Hélène B. Doughty, Terry Patton, William Cissel, and William D. Hutchison

- 3326** **Human diets drive range expansion of megafauna-dispersed fruit species**

Maarten van Zonneveld, Nerea Larranaga, Benjamin Blonder, Lidio Coradin, José I. Hormaza, and Danny Hunter

- 3332** **Extrachromosomal circular DNA-based amplification and transmission of herbicide resistance in crop weed *Amaranthus palmeri***

Dal-Hoe Koo, William T. Molin, Christopher A. Sasaki, Jiming Jiang, Karthik Putta, Mithila Jugulam, Bernd Friebe, and Bikram S. Gill

ANTHROPOLOGY

- 3261** **Early anthropogenic impact on Western Central African rainforests 2,600 y ago**

Yannick Garcin, Pierre Deschamps, Guillemette Ménot, Geoffroy de Saulieu, Enno Schefuß, David Sebag, Lydie M. Dupont, Richard Oslisly, Brian Brademann, Kevin G. Mbusnum, Jean-Michel Onana, Andrew A. Ako, Laura S. Epp, Rik Tjallingii, Manfred R. Strecker, Achim Brauer, and Dirk Sachse

→ See Commentary on page 3202

APPLIED BIOLOGICAL SCIENCES

- 3338** **Single-molecule peptide fingerprinting**

Jetty van Ginkel, Mike Filius, Malwina Szczepaniak, Pawel Tulinski, Anne S. Meyer, and Chirlmin Joo (주철민)

BIOCHEMISTRY

- E2921** **Noncatalytic aspartate at the exonuclease domain of proofreading DNA polymerases regulates both degradative and synthetic activities**

Alicia del Prado, Elsa Franco-Echevarría, Beatriz González, Luis Blanco, Margarita Salas, and Miguel de Vega

- 3249** **Immune-modulating enzyme indoleamine 2,3-dioxygenase is effectively inhibited by targeting its apo-form**

Micah T. Nelp, Patrick A. Kates, John T. Hunt, John A. Newitt, Aaron Balog, Derrick Maley, Xiao Zhu, Lynn Abell, Alban Allentoff, Robert Borzilleri, Hal A. Lewis, Zeyu Lin, Steven P. Seitz, Chunhong Yan, and John T. Groves

- 3344** **Phosphorylation-induced unfolding regulates p19^{INK4d} during the human cell cycle**

Amit Kumar, Mohanraj Gopalswamy, Annika Wolf, David J. Brockwell, Mechthild Hatzfeld, and Jochen Balbach

- 3350** **Substrate recognition and mechanism revealed by ligand-bound polyphosphate kinase 2 structures**

Alice E. Parnell, Silja Mordhorst, Florian Kemper, Mariacarmela Giurrandino, Josh P. Prince, Nikola J. Schwarzer, Alexandre Hofer, Daniel Wohlwend, Henning J. Jessen, Stefan Gerhardt, Oliver Einsle, Petra C. F. Oyston, Jennifer N. Andexer, and Peter L. Roach

- 3356** **Cryo-EM structure of the bacterial actin AlfA reveals unique assembly and ATP-binding interactions and the absence of a conserved subdomain**

Gülsima D. Usluer, Frank DiMaio, Shun Kai Yang, Jesse M. Hansen, Jessica K. Polka, R. Dyche Mullins, and Justin M. Kollman

→ See Commentary on page 3205

- 3362** **Near-atomic cryo-EM imaging of a small protein displayed on a designed scaffolding system**

Yuxi Liu, Shane Gonen, Tamir Gonen, and Todd O. Yeates

- 3368** **Programmable RNA recognition using a CRISPR-associated Argonaute**

Audrone Lapinaite, Jennifer A. Doudna, and Jamie H. D. Cate

- 3374 Structural insights into the sequence-specific recognition of Piwi by *Drosophila* Papi**
Yuhan Zhang, Weiwei Liu, Ronghong Li, Jiaqi Gu, Ping Wu, Chao Peng, Jinbiao Ma, Ligang Wu, Yang Yu, and Ying Huang
- 3380 Archaeal acetoacetyl-CoA thiolase/HMG-CoA synthase complex channels the intermediate via a fused CoA-binding site**
Bastian Vögeli, Sylvain Engilberge, Eric Girard, François Riobé, Olivier Maury, Tobias J. Erb, Seigo Shima, and Tristan Wagner
- BIOPHYSICS AND COMPUTATIONAL BIOLOGY**
- 3219 Correlation analysis framework for localization-based superresolution microscopy**
Joerg Schnitzbauer, Yina Wang, Shijie Zhao, Matthew Bakalar, Tulip Nuwal, Baohui Chen, and Bo Huang
- 3243 Direct observation of ultrafast large-scale dynamics of an enzyme under turnover conditions**
Haim Yuval Aviram, Menahem Pirchi, Hisham Mazal, Yoav Barak, Inbal Riven, and Gilad Haran
- 3386 EF-Tu and EF-G are activated by allosteric effects**
Dibyendu Mondal and Arieh Warshel
- DEVELOPMENTAL BIOLOGY**
- 3392 Lateral cerebellum is preferentially sensitive to high sonic hedgehog signaling and medulloblastoma formation**
I-Li Tan, Alexandre Wojcinski, Harikrishna Rallapalli, Zhimin Lao, Reeti M. Sanghrajka, Daniel Stephen, Eugenia Volkova, Andrey Korshunov, Marc Remke, Michael D. Taylor, Daniel H. Turnbull, and Alexandra L. Joyner
- ECOLOGY**
- 3398 Nitrate is an important nitrogen source for Arctic tundra plants**
Xue-Yan Liu, Keisuke Koba, Lina A. Koyama, Sarah E. Hobbie, Marissa S. Weiss, Yoshiyuki Inagaki, Gaius R. Shaver, Anne E. Giblin, Satoru Hobara, Knute J. Nadelhoffer, Martin Sommerkorn, Edward B. Rastetter, George W. Kling, James A. Laundre, Yuriko Yano, Akiko Makabe, Midori Yano, and Cong-Qiang Liu
- 3404 Reintroductions of birds and mammals involve evolutionarily distinct species at the regional scale**
Charles Thévenin, Maud Mouchet, Alexandre Robert, Christian Kerbiriou, and François Sarrazin
- ENVIRONMENTAL SCIENCES**
- 3314 Rapid growth of the US wildland-urban interface raises wildfire risk**
Volker C. Radeloff, David P. Helmers, H. Anu Kramer, Miranda H. Mockrin, Patricia M. Alexandre, Avi Bar-Massada, Van Butsic, Todd J. Hawbaker, Sebastián Martinuzzi, Alexandra D. Syphard, and Susan I. Stewart
- 3410 Climate warming enhances snow avalanche risk in the Western Himalayas**
J. A. Ballesteros-Cánovas, D. Trappmann, J. Madrigal-González, N. Eckert, and M. Stoffel
- EVOLUTION**
- 3416 Adaptive diversification of growth allometry in the plant *Arabidopsis thaliana***
François Vasseur, Moises Exposito-Alonso, Oscar J. Ayala-Garay, George Wang, Brian J. Enquist, Denis Vile, Cyrille Violle, and Detlef Weigel
- 3422 Sign of selection on mutation rate modifiers depends on population size**
Yevgeniy Raynes, C. Scott Wylie, Paul D. Sniegowski, and Daniel M. Weinreich
- GENETICS**
- E2930 Reconstructing a metazoan genetic pathway with transcriptome-wide epistasis measurements**
David Angeles-Albores, Carmie Puckett Robinson, Brian A. Williams, Barbara J. Wold, and Paul W. Sternberg
- 3428 Four millennia of Iberian biomolecular prehistory illustrate the impact of prehistoric migrations at the far end of Eurasia**
Cristina Valdiosera, Torsten Günther, Juan Carlos Vera-Rodríguez, Irene Ureña, Eneko Iriarte, Ricardo Rodríguez-Varela, Luciana G. Simões, Rafael M. Martínez-Sánchez, Emma M. Svensson, Helena Malmström, Laura Rodríguez, José-María Bermúdez de Castro, Eudald Carbonell, Alfonso Alday, José Antonio Hernández Vera, Anders Götherström, José-Miguel Carretero, Juan Luis Arsuaga, Colin I. Smith, and Mattias Jakobsson
- 3434 DEC2 modulates orexin expression and regulates sleep**
Arisa Hirano, Pei-Ken Hsu, Luoying Zhang, Lijuan Xing, Thomas McMahon, Maya Yamazaki, Louis J. Ptáček, and Ying-Hui Fu
- 3440 Requirement for intron structures in activating the *Cd8a* locus**
Hisashi Wada, Nighat Yasmin, Kiyokazu Kakugawa, Michiko Ohno-Oishi, Sebastian Nieke, Chizuko Miyamoto, Sawako Muroi, and Ichiro Taniuchi
- IMMUNOLOGY AND INFLAMMATION**
- E2940 CD96 expression determines the inflammatory potential of IL-9–producing Th9 cells**
Katarina Stanko, Christina Iwert, Christine Appelt, Katrin Vogt, Julia Schumann, Franziska Janina Strunk, Stefanie Ahrlich, Stephan Schlickeiser, Chiara Romagnani, Karsten Jürchott, Christian Meisel, Gerald Willmsky, Anja A. Köhl, and Birgit Sawitzki
- E2950 Cyclin-dependent kinase activity is required for type I interferon production**
Oya Cingöz and Stephen P. Goff
- E2960 Chronic stress promotes colitis by disturbing the gut microbiota and triggering immune system response**
Xinghua Gao, Qihua Cao, Yan Cheng, Dandan Zhao, Zhuo Wang, Hongbao Yang, Qijin Wu, Linjun You, Yue Wang, Yanting Lin, Xianjing Li, Yun Wang, Jin-Song Bian, Dongdong Sun, Lingyi Kong, Lutz Birnbaumer, and Yong Yang
- MEDICAL SCIENCES**
- E2970 Predicting cancer outcomes from histology and genomics using convolutional networks**
Pooya Mobadersany, Safoora Yousefi, Mohamed Amgad, David A. Gutman, Jill S. Barnholtz-Sloan, José E. Velázquez Vega, Daniel J. Brat, and Lee A. D. Cooper
- E2980 Linking imaging to omics utilizing image-guided tissue extraction**
Jonathan A. Disselhorst, Marcel A. Krueger, S. M. Minhaz Ud-Dean, Ilja Bezrukov, Mohamed A. Jarboui, Christoph Trautwein, Andreas Traube, Christian Spindler, Jonathan M. Cotton, Dieter Leibfritz, and Bernd J. Pichler
- 3446 UBD modifies APOL1-induced kidney disease risk**
Jia-Yue Zhang, Minxian Wang, Lei Tian, Giulio Genovese, Paul Yan, James G. Wilson, Ravi Thadhani, Amy K. Mottl, Gerald B. Appel, Alexander G. Bick, Matthew G. Sampson, Seth L. Alper, David J. Friedman, and Martin R. Pollak

- 3452** **An EZH2-mediated epigenetic mechanism behind p53-dependent tissue sensitivity to DNA damage**
Gamze Kuser-Abali, Lu Gong, Jiawei Yan, Qingqing Liu, Weiqi Zeng, Amanda Williamson, Chuan Bian Lim, Mary Ellen Molloy, John B. Little, Lei Huang, and Zhi-Min Yuan
- MICROBIOLOGY**
- E2988** **Occurrence, evolution, and functions of DNA phosphorothioate epigenetics in bacteria**
Tong Tong, Si Chen, Lianrong Wang, You Tang, Jae Yong Ryu, Susu Jiang, Xiaolin Wu, Chao Chen, Jie Luo, Zixin Deng, Zhiqiang Li, Sang Yup Lee, and Shi Chen
- 3231** **Simple mechanosense and response of cilia motion reveal the intrinsic habits of ciliates**
Takuya Ohmura, Yukinori Nishigami, Atsushi Taniguchi, Shigenori Nonaka, Junichi Manabe, Takuji Ishikawa, and Masatoshi Ichikawa
- 3237** **Structural changes of TasA in biofilm formation of *Bacillus subtilis***
Anne Diehl, Yvette Roske, Linda Ball, Anup Chowdhury, Matthias Hiller, Noel Molière, Regina Kramer, Daniel Stöppler, Catherine L. Worth, Brigitte Schlegel, Martina Leidert, Nils Cremer, Natalja Erdmann, Daniel Lopez, Heike Stephanowitz, Eberhard Krause, Barth-Jan van Rossum, Peter Schmieder, Udo Heinemann, Kürşad Turgay, Ümit Akbey, and Hartmut Oschkinat
- 3458** **Cryo-EM reconstruction of AlfA from *Bacillus subtilis* reveals the structure of a simplified actin-like filament at 3.4-Å resolution**
Andrzej Szewczak-Harris and Jan Löwe
→ See Commentary on page 3205
- NEUROSCIENCE**
- E2997** **Combination of cGMP analogue and drug delivery system provides functional protection in hereditary retinal degeneration**
Eleonora Vighi, Dragana Trifunović, Patricia Veiga-Crespo, Andreas Rentsch, Dorit Hoffmann, Ayse Sahaboglu, Torsten Strasser, Manoj Kulkarni, Evelina Bertolotti, Angélique van den Heuvel, Tobias Peters, Arie Reijerkerk, Thomas Euler, Marius Ueffing, Frank Schwede, Hans-Gottfried Genieser, Pieter Gaillard, Valeria Marigo, Per Ekström, and François Paquet-Durand
- E3007** **Disinhibition of CA1 pyramidal cells by low-dose ketamine and other antagonists with rapid antidepressant efficacy**
Allie J. Widman and Lori L. McMahon
- E3017** **Resonance with subthreshold oscillatory drive organizes activity and optimizes learning in neural networks**
James P. Roach, Aleksandra Pidde, Eitan Katz, Jiaying Wu, Nicolette Ognjanovski, Sara J. Aton, and Michal R. Zochowski
- 3267** **Blindfold learning of an accurate neural metric**
Christophe Gardella, Olivier Marre, and Thierry Mora
- 3464** **Stabilized supralinear network can give rise to bistable, oscillatory, and persistent activity**
Nataliya Kraynyukova and Tatjana Tchumatchenko
- 3470** **Towards an unconscious neural reinforcement intervention for common fears**
Vincent Taschereau-Dumouchel, Aurelio Cortese, Toshinori Chiba, J. D. Knotts, Mitsuo Kawato, and Hakwan Lau
- 3476** **Deletion of dopamine D₂ receptors from parvalbumin interneurons in mouse causes schizophrenia-like phenotypes**
Eugenia Tomasella, Lucila Bechelli, Mora Belén Ogando, Camilo Mininni, Mariano N. Di Guilmi, Fernanda De Fino, Silvano Zanutto, Ana Belén Elgoyhen, Antonia Marin-Burgin, and Diego M. Gelman
- 3482** **Fatty-acid-binding protein 5 controls retrograde endocannabinoid signaling at central glutamate synapses**
Samir Haj-Dahmane, Roh-Yu Shen, Matthew W. Elmes, Keith Studholme, Martha P. Kanjiya, Diane Bogdan, Panayotis K. Thanos, Jeremy T. Miyauchi, Stella E. Tsirka, Dale G. Deutsch, and Martin Kaczocha
- PHYSIOLOGY**
- E3026** **Bilobal architecture is a requirement for calmodulin signaling to Ca_v1.3 channels**
Rahul Banerjee, Jesse B. Yoder, David T. Yue, L. Mario Amzel, Gordon F. Tomaselli, Sandra B. Gabelli, and Manu Ben-Johny
- E3036** **Complex electrophysiological remodeling in postinfarction ischemic heart failure**
Bence Hegyi, Julie Bossuyt, Leigh G. Griffiths, Rafael Shimkunas, Zana Coulibaly, Zhong Jian, Kristin N. Grimsrud, Claus S. Sondergaard, Kenneth S. Ginsburg, Nipavan Chiamvimonvat, Luiz Belardinelli, Andrés Varró, Julius G. Papp, Piero Pollesello, Jouko Levijoki, Leighton T. Izu, W. Douglas Boyd, Tamás Bányász, Donald M. Bers, and Ye Chen-Izu
- 3296** **The Great Recession worsened blood pressure and blood glucose levels in American adults**
Teresa Seeman, Duncan Thomas, Sharon Stein Merkin, Kari Moore, Karol Watson, and Arun Karlamangla
- PLANT BIOLOGY**
- E3045** ***Arabidopsis* TSO1 and MYB3R1 form a regulatory module to coordinate cell proliferation with differentiation in shoot and root**
Wanpeng Wang, Paja Sijacic, Pengbo Xu, Hongli Lian, and Zhongchi Liu
- E3055** **Transcriptome landscape of a bacterial pathogen under plant immunity**
Tatsuya Nobori, André C. Velásquez, Jingni Wu, Brian H. Kvitko, James M. Kremer, Yiming Wang, Sheng Yang He, and Kenichi Tsuda
- 3488** **Mechanistic basis for the activation of plant membrane receptor kinases by SERK-family coreceptors**
Ulrich Hohmann, Julia Santiago, Joël Nicolet, Vilde Olsson, Fabio M. Spiga, Ludwig A. Hothorn, Melinka A. Butenko, and Michael Hothorn
- POPULATION BIOLOGY**
- 3494** **Population genomic analysis of elongated skulls reveals extensive female-biased immigration in Early Medieval Bavaria**
Krishna R. Veeramah, Andreas Rott, Melanie Groß, Lucy van Dorp, Saïoa López, Karola Kirsanow, Christian Sell, Jens Blöcher, Daniel Wegmann, Vivian Link, Zuzana Hofmanová, Joris Peters, Bernd Trautmann, Anja Gairhos, Jochen Haberstroh, Bernd Päffgen, Garrett Hellenthal, Brigitte Haas-Gebhard, Michaela Harbeck, and Joachim Burger

CORRECTIONS (ONLINE ONLY)

INNER WORKINGS

- E3065** **Inner Workings: How the butterfly got its spots (and why it matters)**
Viviane Callier

COMMENTARY**E3066 The complexity of Neanderthal technology***John F. Hoffecker***ECOLOGY****E3067 Phylogenetic classification of the world's tropical forests**

J. W. Ferry Slik, Janet Franklin, Víctor Arroyo-Rodríguez, Richard Field, Salomon Aguilar, Nikolay Aguirre, Jorge Ahumada, Shin-Ichiro Aiba, Luciana F. Alves, Anitha K, Andres Avella, Francisco Mora, Gerardo A. Aymard C., Selene Báez, Patricia Balvanera, Meredith L. Bastian, Jean-François Bastin, Peter J. Bellingham, Eduardo van den Berg, Polyanna da Conceição Bispo, Pascal Boeckx, Katrin Boehning-Gaese, Frans Bongers, Brad Boyle, Fabian Brambach, Francis Q. Brearley, Sandra Brown, Shauna-Lee Chai, Robin L. Chazdon, Shengbin Chen, Phourin Chhang, George Chuyong, Corneille Ewango, Indiana M. Coronado, Jurgi Cristóbal-Azkarate, Heike Culmsee, Kipiro Damas, H. S. Dattaraja, Priya Davidar, Saara J. DeWalt, Hazimah Din, Donald R. Drake, Alvaro Duque, Giselda Durigan, Karl Eichhorn, Eduardo Schmidt Eler, Tsutomu Enoki, Andreas Ensslin, Adandé Belarmain Fandohan, Nina Farwig, Kenneth J. Feeley, Markus Fischer, Olle Forshed, Queila Souza Garcia, Satish Chandra Garkoti, Thomas W. Gillespie, Jean-Francois Gillet, Christelle Gonmadje, Inigo Granzow-de la Cerda, Daniel M. Griffith, James Grogan, Khalid Rehman Hakeem, David J. Harris, Rhett D. Harrison, Andy Hector, Andreas Hemp, Jürgen Homeier, M. Shah Hussain, Guillermo Ibarra-Manríquez, I. Faridah Hanum, Nobuo Imai, Patrick A. Jansen, Carlos Alfredo Joly, Shijo Joseph, Kuswata Kartawinata, Elizabeth Kearsley, Daniel L. Kelly, Michael Kessler, Timothy J. Killeen, Robert M. Kooyman, Yves Laumonier, Susan G. Laurance, William F. Laurance, Michael J. Lawes, Susan G. Letcher, Jeremy Lindsell, Jon Lovett, Jose Lozada, Xinghui Lu, Anne Mette Lykke, Khairil Bin Mahmud, Ni Putu Diana Mahayani, Asyraf Mansor, Andrew R. Marshall, Emanuel H. Martin, Darley

Calderado Leal Matos, Jorge A. Meave, Felipe P. L. Melo, Zhofre Huberto Aguirre Mendoza, Faizah Metali, Vincent P. Medjibe, Jean Paul Metzger, Thiago Metzker, D. Mohandass, Miguel A. Munguía-Rosas, Rodrigo Muñoz, Eddy Nurtjahy, Eddie Lenza de Oliveira, Onrizal, Pia Parolin, Marc Parren, N. Parthasarathy, Ekananda Paudel, Rolando Perez, Eduardo A. Pérez-García, Ulf Pommer, Lourens Poorter, Lan Qi, Maria Teresa F. Piedade, José Roberto Rodrigues Pinto, Axel Dalberg Poulsen, John R. Poulsen, Jennifer S. Powers, Rama Chandra Prasad, Jean-Philippe Puyravaud, Orlando Rangel, Jan Reitsma, Diogo S. B. Rocha, Samir Rolim, Francesco Rovero, Andes Rozak, Kalle Ruokolainen, Ervan Rutishauser, Gemma Rutten, Mohd. Nizam Mohd. Said, Felipe Z. Saiter, Philippe Saner, Braulio Santos, João Roberto dos Santos, Swapan Kumar Sarker, Christine B. Schmitt, Jochen Schoengart, Mark Schulze, Douglas Sheil, Plinio Sist, Alexandre F. Souza, Wilson Roberto Spironello, Tereza Sposito, Robert Steinmetz, Tariq Stevart, Marcio Seiji Suganuma, Rahayu Sukri, Aisha Sultana, Raman Sukumar, Terry Sunderland, Supriyadi, H. S. Suresh, Eizi Suzuki, Marcelo Tabarelli, Jianwei Tang, Ed V. J. Tanner, Natalia Targhetta, Ida Theilade, Duncan Thomas, Jonathan Timberlake, Márcio de Morisson Valeriano, Johan van Valkenburg, Tran Van Do, Hoang Van Sam, John H. Vandermeer, Hans Verbeeck, Ole Reidar Vetaas, Victor Adekunle, Simone A. Vieira, Campbell O. Webb, Edward L. Webb, Timothy Whitfeld, Serge Wich, John Williams, Susan Wiser, Florian Wittmann, Xiaobo Yang, C. Yves Adou Yao, Sandra L. Yap, Rakan A. Zahawi, Rahmad Zakaria, and Runguo Zang

NEUROSCIENCE**E3068 Heterogeneity within the frontoparietal control network and its relationship to the default and dorsal attention networks**

Matthew L. Dixon, Alejandro De La Vega, Caitlin Mills, Jessica Andrews-Hanna, R. Nathan Spreng, Michael W. Cole, and Kalina Christoff