

## From the Cover

- 3030 Symbiotic organs in cephalopods  
 2849 Catalyzing ammonia oxidation to dinitrogen  
 3018 Bird and dinosaur feather proteins  
 3024 Evolution of winged insects  
 3146 Predicting seasonal influenza

## Contents

### THIS WEEK IN PNAS

- 2777 In This Issue

### LETTERS

- 2779 **Frequency tagging cannot measure neural tracking of beat or meter**  
*Vani G. Rajendran and Jan W. H. Schnupp*
- 2781 **Reply to Rajendran and Schnupp: Frequency tagging is sensitive to the temporal structure of signals**  
*Tomas Lenc, Peter E. Keller, Manuel Varlet, and Sylvie Nozaradan*
- 2783 **Music training, music aptitude, and speech perception**  
*E. Glenn Schellenberg*
- 2785 **Reply to Schellenberg: Is there more to auditory plasticity than meets the ear?**  
*Gavin M. Bidelman and Kelsey Mankel*

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

- 2787 **Cities serve as testbeds for evolutionary change**  
*Carolyn Beans*

### PROFILE

- 2791 **Profile of Eric Rignot**  
*Brian Doctrow*  
 → See Inaugural Article on page 1095 in issue 4 of volume 116

### COMMENTARIES

- 2794 **Homogeneous catalysis for the nitrogen fuel cycle**  
*Yanming Liu and Thomas J. Meyer*  
 → See companion article on page 2849
- 2796 **Integrating morphology and phylogenomics supports a terrestrial origin of insect flight**  
*Prashant P. Sharma*  
 → See companion article on page 3024
- 2799 **Squid genomes in a bacterial world**  
*Thomas C. G. Bosch*  
 → See companion article on page 3030



**Cover image:** Pictured is an adult Hawaiian bobtail squid, *Euprymna scolopes*, which has distinct symbiotic organs. Mahdi Belcaid et al. analyzed the genome of *E. scolopes* and found that two of the cephalopod's symbiotic organs—a light organ to protect it from predation and an accessory nidamental gland found only in females—evolved independently of each other. The findings suggest that multiple symbiotic organs can evolve through different pathways within a single host. See the article by Belcaid et al. on pages 3030–3035. Image courtesy of Elizabeth Ellenwood (University of Connecticut, Storrs, CT).

- 2802 **The future of influenza forecasts**  
*Cécile Viboud and Alessandro Vespignani*  
→ See companion article on page 3146

## PERSPECTIVE

- 2805 **Interpreting contemporary trends in atmospheric methane**  
*Alexander J. Turner, Christian Frankenberg, and Eric A. Kort*

## INAUGURAL ARTICLE

- 2814 **Mass spectrometry: From plasma proteins to mitochondrial membranes**  
*Carol V. Robinson*

## PHYSICAL SCIENCES

### APPLIED MATHEMATICS

- 2821 **Harmonic dynamics of the abelian sandpile**  
*Moritz Lang and Mikhail Shkolnikov*

### APPLIED PHYSICAL SCIENCES

- 2831 **Zintl-phase  $\text{Eu}_2\text{ZnSb}_2$ : A promising thermoelectric material with ultralow thermal conductivity**  
*Chen Chen, Wenhua Xue, Shan Li, Zongwei Zhang, Xiaofang Li, Xinyu Wang, Yijie Liu, Jiehe Sui, Xingjun Liu, Feng Cao, Zhifeng Ren, Ching-Wu Chu, Yumei Wang, and Qian Zhang*

### BIOPHYSICS AND COMPUTATIONAL BIOLOGY

- 3012 **Froghoppers jump from smooth plant surfaces by piercing them with sharp spines**  
*Hanns Hagen Goetzke, Jonathan G. Patrick, and Walter Federle*

### CHEMISTRY

- 2837 **Design–functionality relationships for adhesion/growth-regulatory galectins**  
*Anna-Kristin Ludwig, Malwina Michalak, Qi Xiao, Ulrich Gilles, Francisco J. Medrano, Hanyue Ma, Forrest G. FitzGerald, William D. Hasley, Adriel Melendez-Davila, Matthew Liu, Khosrow Rahimi, Nina Yu Kostina, Cesar Rodriguez-Emmenegger, Martin Möller, Ingo Lindner, Herbert Kaltner, Mare Cudic, Dietmar Reusch, Jürgen Kopitz, Antonio Romero, Stefan Oscarson, Michael L. Klein, Hans-Joachim Gabius, and Virgil Percec*

- 2843 **Consecutive feedback-driven constitutional dynamic networks**  
*Liang Yue, Shan Wang, Verena Wulf, Sivan Lilienthal, Françoise Remacle, R. D. Levine, and Itamar Willner*

- 2849 **Homogeneous electrocatalytic oxidation of ammonia to  $\text{N}_2$  under mild conditions**  
*Faezeh Habibzadeh, Susanne L. Miller, Thomas W. Hamann, and Milton R. Smith III*  
→ See Commentary on page 2794

- 2854 **Resonant inelastic X-ray scattering determination of the electronic structure of oxyhemoglobin and its model complex**  
*James J. Yan, Thomas Kroll, Michael L. Baker, Samuel A. Wilson, Richard Décréau, Marcus Lundberg, Dimosthenis Sokaras, Pieter Glatzel, Britt Hedman, Keith O. Hodgson, and Edward I. Solomon*

## EARTH, ATMOSPHERIC, AND PLANETARY SCIENCES

- 2860 **Metabolic preference of nitrate over oxygen as an electron acceptor in foraminifera from the Peruvian oxygen minimum zone**  
*Nicolaas Glock, Alexandra-Sophie Roy, Dennis Romero, Tanita Wein, Julia Weissenbach, Niels Peter Revsbech, Signe Høgslund, David Clemens, Stefan Sommer, and Tal Dagan*

## ENVIRONMENTAL SCIENCES

- 2866 **Visualizing the iron atom exchange front in the Fe(II)-catalyzed recrystallization of goethite by atom probe tomography**  
*Sandra D. Taylor, Jia Liu, Xin Zhang, Bruce W. Arey, Libor Kovarik, Daniel K. Schreiber, Daniel E. Perea, and Kevin M. Rosso*

## PHYSICS

- 2875 **Structural hierarchy confers error tolerance in biological materials**  
*Jonathan A. Michel and Peter J. Yunker*

- 2881 **Universality of local weak interactions and its application for interferometric alignment**  
*Jan Dziewior, Lukas Knips, Demitry Farfurnik, Katharina Senkalla, Nimrod Benshalom, Jonathan Efroni, Jasmin Meinecke, Shimshon Bar-Ad, Harald Weinfurter, and Lev Vaidman*

## STATISTICS

- 3146 **A collaborative multiyear, multimodel assessment of seasonal influenza forecasting in the United States**  
*Nicholas G. Reich, Logan C. Brooks, Spencer J. Fox, Sasikiran Kandula, Craig J. McGowan, Evan Moore, Dave Osthus, Evan L. Ray, Abhinav Tushar, Teresa K. Yamana, Matthew Biggerstaff, Michael A. Johansson, Roni Rosenfeld, and Jeffrey Shaman*  
→ See Commentary on page 2802

## SOCIAL SCIENCES

### SOCIAL SCIENCES

- 2891 **Stalls in Africa's fertility decline partly result from disruptions in female education**  
*Endale Kebede, Anne Goujon, and Wolfgang Lutz*

## BIOLOGICAL SCIENCES

### AGRICULTURAL SCIENCES

- 2897 **Structure–function characterization of an insecticidal protein GNIP1Aa, a member of an MACPF and  $\beta$ -tripod families**  
*Jelena Zaitseva, Daniel Vaknin, Christian Krebs, James Doroghazi, Sara L. Milam, Deepa Balasubramanian, Nicholas B. Duck, and Joerg Freigang*

### BIOCHEMISTRY

- 2814 **Mass spectrometry: From plasma proteins to mitochondrial membranes**  
*Carol V. Robinson*
- 2907 **Phosphorylation-mediated activation of mouse Xkr8 scramblase for phosphatidylserine exposure**  
*Takaharu Sakuragi, Hidetaka Kosako, and Shigekazu Nagata*

- 2913 ***Drosophila melanogaster* nonribosomal peptide synthetase Ebony encodes an atypical condensation domain**  
Thierry Izoré, Julien Tailhades, Mathias Henning Hansen, Joe A. Kaczmarek, Colin J. Jackson, and Max J. Cryle

- 2919 **Structural insights into FTO's catalytic mechanism for the demethylation of multiple RNA substrates**  
Xiao Zhang, Lian-Huan Wei, Yuxin Wang, Yu Xiao, Jun Liu, Wei Zhang, Ning Yan, Gubu Amu, Xinjing Tang, Liang Zhang, and Guifang Jia

- 2925 **Magnesium-sensitive upstream ORF controls PRL phosphatase expression to mediate energy metabolism**  
Serge Hardy, Elie Kostantin, Shan Jin Wang, Tzvetena Hristova, Gabriela Galicia-Vázquez, Pavel V. Baranov, Jerry Pelletier, and Michel L. Tremblay

#### BIOPHYSICS AND COMPUTATIONAL BIOLOGY

- 2875 **Structural hierarchy confers error tolerance in biological materials**  
Jonathan A. Michel and Peter J. Yunker

- 2935 **Molecular basis for AU-rich element recognition and dimerization by the HuR C-terminal RRM**  
Nina Ripin, Julien Boudet, Malgorzata M. Duszczyn, Alexandra Hinniger, Michael Faller, Miroslav Krepl, Abhilash Gadi, Robert J. Schneider, Jirí Šponer, Nicole C. Meisner-Kober, and Frédéric H.-T. Allain

- 2945 **Structural basis for antiarrhythmic drug interactions with the human cardiac sodium channel**  
Phuong T. Nguyen, Kevin R. DeMarco, Igor Vorobyov, Colleen E. Clancy, and Vladimir Yarov-Yarovoy

#### CELL BIOLOGY

- 2955 **Mature vessel networks in engineered tissue promote graft–host anastomosis and prevent graft thrombosis**  
Shahar Ben-Shaul, Shira Landau, Uri Merdler, and Shulamit Levenberg

- 2961 **MGMT-activated DUB3 stabilizes MCL1 and drives chemoresistance in ovarian cancer**  
Xiaowei Wu, Qingyu Luo, Pengfei Zhao, Wan Chang, Yating Wang, Tong Shu, Fang Ding, Bin Li, and Zhihua Liu

- 2967 **ERK2 regulates epithelial-to-mesenchymal plasticity through DOCK10-dependent Rac1/FoxO1 activation**  
Sejeong Shin, Gwen R. Buel, Michal J. Nagiec, Min-Joon Han, Philippe P. Roux, John Blenis, and Sang-Oh Yoon

- 2977 **Abnormal glycogen storage in tuberous sclerosis complex caused by impairment of mTORC1-dependent and -independent signaling pathways**  
Rituraj Pal, Yan Xiong, and Marco Sardiello

- 2987 **Canonical Wnt is inhibited by targeting one-carbon metabolism through methotrexate or methionine deprivation**  
Lauren V. Albrecht, Maggie H. Bui, and Edward M. De Robertis

- 2996 **Chaperone-mediated autophagy is involved in the execution of ferroptosis**  
Zheming Wu, Yang Geng, Xiaojuan Lu, Yuying Shi, Guowei Wu, Mengmeng Zhang, Bing Shan, Heling Pan, and Junying Yuan

#### ECOLOGY

- 3006 **Monarch butterfly and milkweed declines substantially predate the use of genetically modified crops**  
J. H. Boyle, H. J. Dalgleish, and J. R. Puzey

#### EVOLUTION

- 3012 **Froghoppers jump from smooth plant surfaces by piercing them with sharp spines**  
Hanns Hagen Goetzke, Jonathan G. Patrick, and Walter Federle

- 3018 **The molecular evolution of feathers with direct evidence from fossils**  
Yanhong Pan, Wenxia Zheng, Roger H. Sawyer, Michael W. Pennington, Xiaoting Zheng, Xiaoli Wang, Min Wang, Liang Hu, Jingmai O'Connor, Tao Zhao, Zhiheng Li, Elena R. Schroeter, Feixiang Wu, Xing Xu, Zhonghe Zhou, and Mary H. Schweitzer

- 3024 **Evolutionary history of Polyneoptera and its implications for our understanding of early winged insects**  
Benjamin Wipfler, Harald Letsch, Paul B. Frandsen, Paschalia Kapli, Christoph Mayer, Daniela Bartel, Thomas R. Buckley, Alexander Donath, Janice S. Edgerly-Rooks, Mari Fujita, Shanlin Liu, Ryuichiro Machida, Yuta Mashimo, Bernhard Misof, Oliver Niehuis, Ralph S. Peters, Malte Petersen, Lars Podsiadlowski, Kai Schütte, Shota Shimizu, Toshiki Uchifune, Jeanne Wilbrandt, Evgeny Yan, Xin Zhou, and Sabrina Simon  
→ See Commentary on page 2796

- 3030 **Symbiotic organs shaped by distinct modes of genome evolution in cephalopods**  
Mahdi Belcaid, Giorgio Casaburi, Sarah J. McAnulty, Hannah Schmidbaur, Andrea M. Suria, Silvia Moriano-Gutierrez, M. Sabrina Pankey, Todd H. Oakley, Natacha Kremer, Eric J. Koch, Andrew J. Collins, Hoan Nguyen, Sai Lek, Irina Goncharenko-Foster, Patrick Minx, Erica Sodergren, George Weinstock, Daniel S. Rokhsar, Margaret McFall-Ngai, Oleg Simakov, Jamie S. Foster, and Spencer V. Nyholm  
→ See Commentary on page 2799

- 3036 **Convergent gene losses illuminate metabolic and physiological changes in herbivores and carnivores**  
Nikolai Hecker, Virag Sharma, and Michael Hiller

#### GENETICS

- 3042 **SraL sRNA interaction regulates the terminator by preventing premature transcription termination of rho mRNA**  
Inês Jesus Silva, Susana Barahona, Alex Eyraud, David Lalaouna, Nara Figueroa-Bossi, Eric Massé, and Cecilia Maria Arraiano

- 3052 **Relapse-associated AURKB blunts the glucocorticoid sensitivity of B cell acute lymphoblastic leukemia**  
Coralie Poulard, Hye Na Kim, Mimi Fang, Karina Kruth, Celine Gagnieux, Daniel S. Gerke, Deepa Bhojwani, Yong-Mi Kim, Martin Kampmann, Michael R. Stallcup, and Miles A. Pufall

- 3062 **Defining the impact of mutation accumulation on replicative lifespan in yeast using cancer-associated mutator phenotypes**  
Mitchell B. Lee, Ian T. Dowsett, Daniel T. Carr, Brian M. Wasko, Sarah G. Stanton, Michael S. Chung, Niloufar Ghodsian, Anna Bode, Michael G. Kiflezghi, Priya A. Uppal, Katherine A. Grayden, Yordanos C. Elala, Thao T. Tang, Ngoc H. B. Tran, Thu H. B. Tran, Anh B. Diep, Michael Hope, Daniel E. L. Promislow, Scott R. Kennedy, Matt Kaerberlein, and Alan J. Herr

- 3072 **Humanized UGT2 and CYP3A transchromosomal rats for improved prediction of human drug metabolism**  
Yasuhiro Kazuki, Kaoru Kobayashi, Masumi Hirabayashi, Satoshi Abe, Naoyo Kajitani, Kanako Kazuki, Shoko Takehara, Masato Takiguchi, Daisuke Satoh, Jiro Kuze, Tetsushi Sakuma, Takehito Kaneko, Tomoji Mashimo, Minori Osamura, Mari Hashimoto, Riko Wakatsuki, Rika Hirashima, Ryoichi Fujiwara, Tsuneo Deguchi, Atsushi Kurihara, Yasuko Tsukazaki, Naoto Senda, Takashi Yamamoto, Nico Scheer, and Mitsuo Oshimura

- 3082** **Experimental evolutionary studies on the genetic autonomy of the cytoplasmic genome “plasmon” in the *Triticum* (wheat)–*Aegilops* complex**  
Koichiro Tsunewaki, Naoki Mori, and Shigeo Takumi
- 3091** **Comparative transcriptomics method to infer gene coexpression networks and its applications to maize and rice leaf transcriptomes**  
Yao-Ming Chang, Hsin-Hung Lin, Wen-Yu Liu, Chun-Ping Yu, Hsiang-June Chen, Putu Puja Wartini, Yi-Ying Kao, Yeh-Hua Wu, Jinn-Jy Lin, Mei-Yeh Jade Lu, Shih-Long Tu, Shu-Hsing Wu, Shin-Han Shiu, Maurice S. B. Ku, and Wen-Hsiung Li

#### IMMUNOLOGY AND INFLAMMATION

- 3100** **Second-generation IL-2 receptor-targeted diphtheria fusion toxin exhibits antitumor activity and synergy with anti-PD-1 in melanoma**  
Laurene S. Cheung, Juan Fu, Pankaj Kumar, Amit Kumar, Michael E. Urbanowski, Elizabeth A. Ihms, Sadiya Parveen, C. Korin Bullen, Garrett J. Patrick, Robert Harrison, John R. Murphy, Drew M. Pardoll, and William R. Bishai
- 3106** **IL-27 confers a protumorigenic activity of regulatory T cells via CD39**  
Young-Jun Park, Heeju Ryu, Garam Choi, Byung-Seok Kim, Eun Sook Hwang, Hun Sik Kim, and Yeonseok Chung
- 3112** **Most viral peptides displayed by class I MHC on infected cells are immunogenic**  
Nathan P. Croft, Stewart A. Smith, Jana Pickering, John Sidney, Bjoern Peters, Pouya Faridi, Matthew J. Witney, Prince Sebastian, Inge E. A. Flesch, Sally L. Heading, Alessandro Sette, Nicole L. La Gruta, Anthony W. Purcell, and David C. Tschärke
- 3118** **High ambient temperature dampens adaptive immune responses to influenza A virus infection**  
Miyu Moriyama and Takeshi Ichinohe

- 3126** **DGAT1 inhibits retinol-dependent regulatory T cell formation and mediates autoimmune encephalomyelitis**  
Kareem L. Graham, Bonnie J. Werner, Kimberly M. Moyer, Alycia K. Patton, Charles R. Krois, Hong Sik Yoo, Maria Tverskoy, Melissa LaJevic, Joseph L. Napoli, Raymond A. Sobel, Brian A. Zabel, and Eugene C. Butcher
- 3136** **Breaking tolerance with engineered class I antigen-presenting molecules**  
Christopher A. Parks, Kalli R. Henning, Kevin D. Pavelko, Michael J. Hansen, Virginia P. Van Keulen, Brendan K. Reed, Jennifer D. Stone, Adam G. Schrum, Diana Gil, David M. Kranz, Andrew J. Bordner, Michael A. Barry, and Larry R. Pease

#### MEDICAL SCIENCES

- 3146** **A collaborative multiyear, multimodel assessment of seasonal influenza forecasting in the United States**  
Nicholas G. Reich, Logan C. Brooks, Spencer J. Fox, Sasikiran Kandula, Craig J. McGowan, Evan Moore, Dave Osthus, Evan L. Ray, Abhinav Tushar, Teresa K. Yamana, Matthew Biggerstaff, Michael A. Johansson, Roni Rosenfeld, and Jeffrey Shaman  
→ See Commentary on page 2802
- 3155** **Calcineurin dephosphorylates Kelch-like 3, reversing phosphorylation by angiotensin II and regulating renal electrolyte handling**  
Kenichi Ishizawa, Qin Wang, Jinping Li, Osamu Yamazaki, Yoshifuru Tamura, Yoshihide Fujigaki, Shunya Uchida, Richard P. Lifton, and Shigeru Shibata
- 3161** **Increased gene copy number of *DEFA1/DEFA3* worsens sepsis by inducing endothelial pyroptosis**  
QiXing Chen, Yang Yang, JinChao Hou, Qiang Shu, YiXuan Yin, WeiTao Fu, Feng Han, TingJun Hou, CongLi Zeng, Elizabetha Nemeth, Rose Linzmeier, Tomas Ganz, and XiangMing Fang

#### MICROBIOLOGY

- 3171** **A glycol radical enzyme enables hydrogen sulfide production by the human intestinal bacterium *Bilophila wadsworthia***  
Spencer C. Peck, Karin Denger, Anna Burrichter, Stephanina M. Irwin, Emily P. Balskus, and David Schleheck
- 3177** **DNA helicase RecQ1 regulates mutually exclusive expression of virulence genes in *Plasmodium falciparum* via heterochromatin alteration**  
Zhou Li, Shigang Yin, Maoxin Sun, Xiu Cheng, Jieqiong Wei, Nicolas Gilbert, Jun Miao, Liwang Cui, Zhenghui Huang, Xueyu Dai, and Lubin Jiang
- 3183** **Comparative 3D genome organization in apicomplexan parasites**  
Evelien M. Bunnik, Aarthi Venkat, Jianlin Shao, Kathryn E. McGovern, Gayani Batugedara, Danielle Worth, Jacques Prudhomme, Stacey A. Lapp, Chiara Andolina, Leila S. Ross, Lauren Lawres, Declan Brady, Photini Sinnis, Francois Nosten, David A. Fidock, Emma H. Wilson, Rita Tewari, Mary R. Galinski, Choukri Ben Mamoun, Ferhat Ay, and Karine G. Le Roch
- 3193** **Intercellular cooperation in a fungal plant pathogen facilitates host colonization**  
Rémi Peyraud, Malick Mbengue, Adelin Barbacci, and Sylvain Raffaele
- 3202** **The *Mycobacterium tuberculosis* Pup-proteasome system regulates nitrate metabolism through an essential protein quality control pathway**  
Samuel H. Becker, Jordan B. Jastrab, Avantika Dhabaria, Catherine T. Chaton, Jeffrey S. Rush, Konstantin V. Korotkov, Beatrix Ueberheide, and K. Heran Darwin
- 3211** **Movement dynamics of divise proteins and PBP2x: FtsW in cells of *Streptococcus pneumoniae***  
Amilcar J. Perez, Yann Cesbron, Sidney L. Shaw, Jesus Bazan Villicana, Ho-Ching T. Tsui, Michael J. Boersma, Ziyun A. Ye, Yanina Tovpeko, Cees Dekker, Seamus Holden, and Malcolm E. Winkler
- 3221** ***Legionella pneumophila* translocated translation inhibitors are required for bacterial-induced host cell cycle arrest**  
Asaf Sol, Erion Lipo, Dennise A. de Jesús-Díaz, Connor Murphy, Mildred Devereux, and Ralph R. Isberg
- 3229** **CD4 receptor diversity in chimpanzees protects against SIV infection**  
Frederic Bibollet-Ruche, Ronnie M. Russell, Weimin Liu, Guillaume B. E. Stewart-Jones, Scott Sherrill-Mix, Yingying Li, Gerald H. Learn, Andrew G. Smith, Marcos V. P. Gondim, Lindsey J. Plenderleith, Julie M. Decker, Juliet L. Easlick, Katherine S. Wetzell, Ronald G. Collman, Shilei Ding, Andrés Finzi, Ahidjo Ayouba, Martine Peeters, Fabian H. Leendertz, Joost van Schijndel, Annemarie Goedmakers, Els Ton, Christophe Boesch, Hjalmar Kuehl, Mimi Arandjelovic, Paula Dieguez, Mizuki Murai, Christelle Colin, Kathelijne Koops, Sheri Speede, Mary K. Gonder, Martin N. Muller, Crickette M. Sanz, David B. Morgan, Rebecca Atencia, Debby Cox, Alex K. Piel, Fiona A. Stewart, Jean-Bosco N. Ndjongo, Deus Mjungu, Elizabeth V. Lonsdorf, Anne E. Pusey, Peter D. Kwong, Paul M. Sharp, George M. Shaw, and Beatrice H. Hahn

#### NEUROSCIENCE

- 3239** **Local homogeneity of tonotopic organization in the primary auditory cortex of marmosets**  
Huan-huan Zeng, Jun-feng Huang, Ming Chen, Yun-qing Wen, Zhi-ming Shen, and Mu-ming Poo
- 3245** **Genetically eliminating Purkinje neuron GABAergic neurotransmission increases their response gain to vestibular motion**  
Trace L. Stay, Jean Laurens, Roy V. Sillitoe, and Dora E. Angelaki



**3251** **Persistent metabolic youth in the aging female brain**  
Manu S. Goyal, Tyler M. Blazey, Yi Su, Lars E. Couture, Tony J. Durbin, Randall J. Bateman, Tammie L.-S. Benzinger, John C. Morris, Marcus E. Raichle, and Andrei G. Vlassenko

**3256** **TrkB-expressing neurons in the dorsomedial hypothalamus are necessary and sufficient to suppress homeostatic feeding**  
Guey-Ying Liao, Clint E. Kinney, Juan Ji An, and Baoji Xu

**3262** **Presynaptic SNAP-25 regulates retinal waves and retinogeniculate projection via phosphorylation**  
Yu-Tien Hsiao, Wen-Chi Shu, Pin-Chun Chen, Hui-Ju Yang, Hsin-Yo Chen, Sheng-Ping Hsu, Yi-Ting Huang, Cheng-Chang Yang, Yen-Ju Chen, Ni-Yen Yu, Shih-Yuan Liou, Ning Chiang, Chien-Ting Huang, Tzu-Lin Cheng, Lam-Yan Cheung, Yu-Chun Lin, Juu-Chin Lu, and Chih-Tien Wang

**3268** **High-dimensional representation of texture in somatosensory cortex of primates**  
Justin D. Lieber and Sliman J. Bensmaïa

**3278** **Inositol hexakisphosphate kinase 3 promotes focal adhesion turnover via interactions with dynein intermediate chain 2**  
Tomas Rojas, Weiwei Cheng, Zhe Gao, Xiaoqi Liu, Yakun Wang, Adarsha P. Malla, Alfred C. Chin, Lewis H. Romer, Solomon H. Snyder, and Chenglai Fu

#### PHARMACOLOGY

**3288** **Diverse GPCRs exhibit conserved water networks for stabilization and activation**  
A. J. Venkatakrisnan, Anthony K. Ma, Rasmus Fonseca, Naomi R. Latorraca, Brendan Kelly, Robin M. Betz, Chaitanya Asawa, Brian K. Kobilka, and Ron O. Dror

**3294** **Ca<sup>2+</sup> allosteric in PTH-receptor signaling**  
Alex D. White, Fei Fang, Frédéric G. Jean-Alphonse, Lisa J. Clark, Hyun-Jung An, Hongda Liu, Yang Zhao, Shelley L. Reynolds, Sihoon Lee, Kunhong Xiao, Ieva Sutkeviciute, and Jean-Pierre Vilardaga

#### PHYSIOLOGY

**2837** **Design–functionality relationships for adhesion/growth-regulatory galectins**  
Anna-Kristin Ludwig, Malwina Michalak, Qi Xiao, Ulrich Gilles, Francisco J. Medrano, Hanyue Ma, Forrest G. FitzGerald, William D. Hasley, Adriel Melendez-Davila, Matthew Liu, Khosrow Rahimi, Nina Yu Kostina, Cesar Rodriguez-Emmenegger, Martin Möller, Ingo Lindner, Herbert Kaltner, Mare Cudic, Dietmar Reusch, Jürgen Kopitz, Antonio Romero, Stefan Oscarson, Michael L. Klein, Hans-Joachim Gabius, and Virgil Percec

**2860** **Metabolic preference of nitrate over oxygen as an electron acceptor in foraminifera from the Peruvian oxygen minimum zone**  
Nicolaas Glock, Alexandra-Sophie Roy, Dennis Romero, Tanita Wein, Julia Weissenbach, Niels Peter Revsbech, Signe Høgslund, David Clemens, Stefan Sommer, and Tal Dagan

#### PLANT BIOLOGY

**3300** **Regulatory cascade involving transcriptional and N-end rule pathways in rice under submergence**  
Chih-Cheng Lin, Ya-Ting Chao, Wan-Chieh Chen, Hsiu-Yin Ho, Mei-Yi Chou, Ya-Ru Li, Yu-Lin Wu, Hung-An Yang, Hsiang Hsieh, Choun-Sea Lin, Fu-Hui Wu, Shu-Jen Chou, Hao-Chung Jen, Yung-Hsiang Huang, Deli Irene, Wen-Jin Wu, Jian-Li Wu, Daniel J. Gibbs, Meng-Chiao Ho, and Ming-Che Shih

#### PSYCHOLOGICAL AND COGNITIVE SCIENCES

**3310** **Musical reward prediction errors engage the nucleus accumbens and motivate learning**  
Benjamin P. Gold, Ernest Mas-Herrero, Yashar Zeighami, Mitchel Benovoy, Alain Dagher, and Robert J. Zatorre

**3316** **Hippocampal atrophy and intrinsic brain network dysfunction relate to alterations in mind wandering in neurodegeneration**  
Claire O'Callaghan, James M. Shine, John R. Hodges, Jessica R. Andrews-Hanna, and Muireann Irish

#### SUSTAINABILITY SCIENCE

**3322** **Impacts of the Northwest Forest Plan on forest composition and bird populations**  
Benjamin T. Phalan, Joseph M. Northrup, Zhiqiang Yang, Robert L. Deal, José S. Rousseau, Thomas A. Spies, and Matthew G. Betts

#### SYSTEMS BIOLOGY

**2843** **Consecutive feedback-driven constitutional dynamic networks**  
Liang Yue, Shan Wang, Verena Wulf, Sivan Lilienthal, Françoise Remacle, R. D. Levine, and Itamar Willner

**3328** **Genome-wide colocalization of RNA–DNA interactions and fusion RNA pairs**  
Zhangming Yan, Norman Huang, Weixin Wu, Weizhong Chen, Jiang, Jingyao Chen, Xuerui Huang, Xingzhao Wen, Jie Xu, Qiushi Jin, Kang Zhang, Zhen Chen, Shu Chien, and Sheng Zhong

#### CORRECTIONS

##### BIOCHEMISTRY

**3338** **Cellular clearance of circulating transthyretin decreases cell-nonautonomous proteotoxicity in *Caenorhabditis elegans***  
Kayalvizhi Madhivanan, Erin R. Greiner, Miguel Alves-Ferreira, David Soriano-Castell, Nirvan Rouzbeh, Carlos A. Aguirre, Johan F. Paulsson, Justin Chapman, Xin Jiang, Felicia K. Ooi, Carolina Lemos, Andrew Dillin, Veena Prahlad, Jeffery W. Kelly, and Sandra E. Encalada

##### NEUROSCIENCE

**3339** **Prefrontal D1 dopamine signaling is required for temporal control**  
Nandakumar S. Narayanan, Benjamin B. Land, John E. Solder, Karl Deisseroth, and Ralph J. DiLeone