

VOLUME 7

OCTOBER 1991

NUMBER 4

# V I S U A L N E U R O S C I E N C E

An international journal for empirical and theoretical research

EDITOR

KATHERINE V. FITE  
UNIVERSITY OF MASSACHUSETTS, AMHERST

CAMBRIDGE UNIVERSITY PRESS

# V I S U A L N E U R O S C I E N C E

(ISSN 0952-5238)

## EDITOR

KATHERINE V. FITE  
*University of Massachusetts at Amherst*

## EDITORIAL BOARD

Paola Bagnoli, *University of Pisa, Italy*  
Denis Baylor, *Stanford University*  
Mark Berkley, *Florida State University*  
Joseph Besharse, *University of Kansas*  
Vivien Casagrande (Associate Editor), *Vanderbilt University*  
Leo Chalupa, *University of California, Davis*  
Steven Chamberlain, *Syracuse University*  
Max S. Cynader (Associate Editor), *University of British Columbia*  
Robert Desimone, *National Institute of Mental Health*  
Bodgan Dreher, *University of Sydney, Australia*  
Stephen Easter, Jr., *University of Michigan*  
Bill Eldred, *Boston University*  
Barrie Frost, *Queen's University, Ontario, Canada*  
Roland Giolli, *University of California, Irvine*  
Shaul Hochstein, *Hebrew University, Jerusalem, Israel*  
William Hodos (Associate Editor), *University of Maryland*  
Harvey Karten (Associate Editor), *University of California, San Diego*  
Bruce Knight (Associate Editor), *Rockefeller University*  
Helga Kolb (Associate Editor), *University of Utah*

Peter Lennie, *University of Rochester*  
James McIlwain (Associate Editor), *Brown University*  
Robert Marc, *University of Texas*  
Frederick Miles, *National Eye Institute*  
Ranney Mize, *University of Tennessee, Memphis*  
William Newsome, *Stanford University*  
Leo Peichl, *Max Planck Institut, Frankfurt, Federal Republic of Germany*  
Maureen Powers, *Vanderbilt University*  
John Robson (Associate Editor), *University of Cambridge*  
Andre Roucoux, *University of Louvain, Brussels, Belgium*  
Robert Shapley (Associate Editor), *New York University*  
Peter Spear, *University of Wisconsin*  
Peter Sterling, *University of Pennsylvania*  
Mriganka Sur, *Massachusetts Institute of Technology*  
Tadaharu Tsumoto, *Osaka University Medical School, Japan*  
Leslie Ungerleider, *National Institute of Mental Health*  
Rudiger Von Der Heydt, *University Hospital, Zurich, Switzerland*  
Stephen Yazulla, *State University of New York, Stony Brook*

**Visual Neuroscience** brings together in one journal a broad range of studies reflecting both the diversity and originality of contemporary research and theory in basic visual neuroscience. Primary emphasis is placed upon studies which address the retinal and brain mechanisms that underlie visually-guided behaviors and visual perception. *Visual Neuroscience* publishes original papers utilizing neuro-anatomical, neurophysiological, neurochemical, neuroimmunological, and behavioral methodologies as well as those involving computational models and computer-assisted theoretical formulations. Contributions involving molecular, cellular, local-circuit, and systems-level analyses in both vertebrate and invertebrate species will be presented. Appropriate research topics include: photoreception and transduction; retinal anatomy, physiology, and neurochemistry; developmental processes and patterns; subcortical visual pathways; oculomotor and visuomotor pathways and circuits; comparative visual system organization; thalamo-cortical pathways, visual cortex, and perceptual mechanisms. Manuscripts based exclusively upon psychophysical or behavioral data will be considered only if presented within the context of visual neural processes and/or mechanisms.

**Visual Neuroscience** is indexed in Current Contents/Life Sciences; Science Citation Index; Ocular Resources Review; and in the SCISEARCH and ISI/BIOMED databases.

**Editorial Office:** James T. McIlwain, Editor-Designate, *Visual Neuroscience*, Brown University, Box G-M416, Providence, RI 02912, USA. Telephone (401)863-2159. E-mail: BI599003@BROWNVN.

**Publishing, Subscription and Advertising Offices:** Cambridge University Press, 40 West 20th Street, New York, NY 10011, USA; and (outside the US and Canada) Cambridge University Press, The Edinburgh Building, Shaftesbury Road, Cambridge CB2 2RU, England.

**Published Monthly.** Annual institutional subscription rates: US \$280.00 in the US and Canada; UK £182.00 elsewhere. Individual rates: US \$120.00 in the US and Canada; UK £84.00 elsewhere. Special rates for students (with certification of status): US \$80.00 in the US and Canada; UK £58.00 elsewhere. Prices include postage and insurance.

Copyright © 1991 Cambridge University Press

All rights reserved. No part of this publication may be reproduced, in any form or by any means, electronic, photocopying or otherwise, without permission in writing from Cambridge University Press. *Photocopying information for users in the U.S.A.:* The Item-Fee Code for this publication (0952-5238/91 \$5.00 + .00) indicates that copying for internal or personal use beyond that permitted by Sec. 107 or 108 of the U.S. Copyright Law is authorized for users duly registered with the Copyright Clearance Center (CCC) Transaction Reporting Service, provided that the appropriate remittance of \$5.00 per article is paid directly to: CCC, 27 Congress Street, Salem, MA 01970. Specific written permission must be obtained for all other copying.

Application to mail at second-class rates pending at New York, NY and additional mailing offices. Postmaster: send address changes in the US and Canada to: *Visual Neuroscience*, Journals Department, Cambridge University Press, 110 Midland Avenue, Port Chester, NY 10573.