

# JOURNAL OF VIROLOGY

VOLUME 57 • FEBRUARY 1986 • NUMBER 2

**Arnold J. Levine**, *Editor in Chief* (1989)

*Princeton University*  
*Princeton, N.J.*

**David T. Denhardt**, *Editor* (1987)  
*University of Western Ontario*  
*London, Ontario, Canada*

**Bernard N. Fields**, *Editor* (1988)  
*Harvard Medical School*  
*Boston, Mass.*

**Robert M. Krug**, *Editor* (1987)  
*Sloan-Kettering Institute*  
*New York, N.Y.*

**Michael B. A. Oldstone**, *Editor* (1988)  
*Scripps Clinic & Research Foundation*  
*La Jolla, Calif.*

**Thomas E. Shenk**, *Editor* (1989)  
*Princeton University*  
*Princeton, N.J.*

**Anna Marie Skalka**, *Editor* (1989)  
*Hoffmann-La Roche Inc.*  
*Nutley, N.J.*

**Robert A. Weisberg**, *Editor* (1988)  
*National Institute of Child Health*  
*and Human Development*  
*Bethesda, Md.*

## EDITORIAL BOARD

David Baltimore (1987)  
Tamar Ben-Porat (1987)  
Kenneth I. Berns (1988)  
Michael Botchan (1986)  
Barrie J. Carter (1987)  
John M. Coffin (1986)  
Geoffrey M. Cooper (1987)  
Donald Court (1987)  
Richard Courtney (1986)  
Clyde S. Crumpacker II (1988)  
Walter Doerfler (1986)  
Peter Doherty (1986)  
Elvera Ehrenfeld (1986)  
Robert N. Eisenman (1988)  
Suzanne U. Emerson (1986)  
Emanuel Faust (1987)  
S. Jane Flint (1987)  
Costa Georgopolous (1986)  
Walter Gerhard (1986)  
Larry M. Gold (1988)  
Hidesaburo Hanafusa (1986)  
William S. Hayward (1987)  
Roger Hendrix (1987)

Martin Hirsch (1986)  
John J. Holland (1987)  
Ian H. Holmes (1986)  
Robert W. Honess (1986)  
Nancy Hopkins (1986)  
Peter M. Howley (1987)  
Alice S. Huang (1987)  
Tony Hunter (1986)  
Thomas J. Kelly, Jr. (1988)  
George Khoury (1987)  
Elliott Kieff (1987)  
Daniel Kolakofsky (1986)  
Robert Lamb (1988)  
Robert A. Lazzarini (1987)  
Myron Levine (1988)  
Douglas R. Lowy (1986)  
Robert Martin (1987)  
Warren Masker (1987)  
Thomas Merigan (1986)  
George Miller (1987)  
Lois K. Miller (1988)  
Peter Model (1986)  
Bernard Moss (1986)

Fred Murphy (1986)  
Nancy G. Nossal (1987)  
Abner Notkins (1986)  
J. Thomas Parsons (1986)  
Ulf G. Pettersson (1986)  
Lennart Philipson (1987)  
Lewis I. Pizer (1987)  
Craig R. Pringle (1986)  
Carol Prives (1986)  
Robert Purcell (1986)  
Fred Rapp (1987)  
Dan S. Ray (1986)  
Gordon M. Ringold (1987)  
Harriet Robinson (1988)  
William S. Robinson (1986)  
Bernard Roizman (1988)  
John K. Rose (1988)  
Naomi Rosenberg (1986)  
Roland R. Rueckert (1988)  
Norman P. Salzman (1987)  
Joseph Sambrook (1988)  
Charles E. Samuel (1986)  
Priscilla A. Schaffer (1987)

Sondra Schlesinger (1986)  
Manfred Schubert (1988)  
June R. Scott (1986)  
Bart Sefton (1988)  
Charles J. Sherr (1987)  
Saul J. Silverstein (1988)  
Patricia G. Spear (1987)  
Nat Sternberg (1986)  
Mark F. Stinski (1986)  
James Strauss (1987)  
F. William Studier (1987)  
Lawrence S. Sturman (1988)  
William Summers (1988)  
John M. Taylor (1987)  
Howard M. Temin (1988)  
George F. Vande Woude (1986)  
Inder Verma (1986)  
Edward K. Wagner (1986)  
Eckard Wimmer (1988)  
Owen Witte (1986)  
Charles Hamish Young (1986)  
Julius S. Youngner (1986)

**Helen R. Whiteley**, *Chairman, Publications Board*

**Linda M. Illig**, *Managing Editor, Journals*

The *Journal of Virology* (ISSN 0022-538X), a publication of the American Society for Microbiology, 1913 I St., NW, Washington, DC 20006, is devoted to the dissemination of fundamental knowledge concerning viruses of bacteria, plants, and animals. Investigators are invited to submit reports of original research in all areas of basic virology, including biochemistry, biophysics, genetics, immunology, morphology, physiology, and pathogenesis and immunity. Instructions to authors are published in the January issue each year; reprints are available from the editors and the Publications Department. The *Journal* is issued monthly, four volumes per year. The nonmember subscription price is \$285 per year; single copies are \$21. The member subscription price is \$41 (foreign, \$54 [surface rate]) per year; single copies are \$7.00. Correspondence relating to subscriptions, reprints, defective copies, availability of back issues, lost or late proofs, disposition of submitted manuscripts, and general editorial matters should be directed to the ASM Publications Department, 1913 I St., NW, Washington, DC 20006 (phone: 202 833-9680).

Claims for missing issues from residents of the United States, Canada, and Mexico must be submitted within 3 months after publication of the issues; residents of all other countries must submit claims within 6 months of publication of the issues. Claims for issues missing because of failure to report an address change or for issues "missing from files" will not be allowed.

Second-class postage paid at Washington, DC 20006, and at additional mailing offices.

POSTMASTER: Send address changes to *Journal of Virology*, ASM, 1913 I St., NW, Washington, DC 20006.

Made in the U.S.A.

Copyright © 1986, American Society for Microbiology.

日本：価格は外貨表示とは関係なく円建

All Rights Reserved.

The code at the top of the first page of an article in this journal indicates the copyright owner's consent that copies of the article may be made for personal use or for personal use of specific clients. This consent is given on the condition, however, that the copier pay the stated per-copy fee through the Copyright Clearance Center, 21 Congress St., Salem, MA 01970, for copying beyond that permitted by Sections 107 and 108 of the U.S. Copyright Law. This consent does not extend to other kinds of copying, such as copying for general distribution, for advertising or promotional purposes, for creating new collective works, or for resale.

# Author Index

- Adam, Stephen A., 614  
Anderson, Janice R., 446  
Astell, Caroline R., 566
- Bauer, William R., 433  
Belardelli, Filippo, 456  
Bell, Susanne, 647  
Bestwick, Richard K., 534  
Bisher, Margaret E., 578  
Buckler-White, Alicia J., 697  
Buckmaster, Anne, 647  
Burkhardt, Anne L., 629
- Caldwell, Susan E., 678  
Callahan, Robert, 709  
Caton, Andrew J., 623  
Choi, Yang Do, 614  
Chou, Joany, 629  
Chu, Chi-Ming, 693  
Clark, Robin, 539  
Cole, Charles N., 539  
Colicelli, John, 674  
Coligan, John E., 481  
Colonno, Richard J., 438  
Cowie, Alison, 505  
Croissant, Odile, 688  
Crowell, Richard L., 438  
Curran, Joseph A., 684
- Deen, Keith C., 422  
Desrosiers, Ronald C., 701  
Diamond, David C., 638  
DiMaio, Daniel, 475  
DiPaolo, Joseph A., 572  
Doms, Robert W., 603  
Doniger, Jay, 572  
Dreyfuss, Gideon, 614
- Efstathiou, Stacey, 446
- Eiden, Joseph, 706  
Elango, Narayanasamy, 481  
Emini, Emilio A., 438, 638
- Favre, Michel, 688  
Field, A. Kirk, 438  
Field, Hugh J., 446  
Fleming, Jo-Ann G. W., 552
- Gallahan, Daniel, 709  
Gardiner, Edith M., 656  
Gerhard, Walter, 623  
Gessani, Sandra, 456  
Gething, Mary-Jane, 603  
Goff, Stephen P., 674  
Greenberg, Harry B., 585  
Gresser, Ion, 456  
Guarino, Linda A., 563
- Hay, John, 578  
Helenius, Ari, 603  
Henneberry, Jean, 603  
Hodgman, Charles, 647  
Hogg, Evelyn, 709
- Isfort, Robert J., 464  
Ishijima, Yoichi, 670
- Jablonska, Stefania, 688  
Jambou, Robert C., 481  
Jones, Ronald, 585
- Kabat, David, 534  
Kai, Chieko, 670  
Kamen, Robert, 505  
Kawashima, Makoto, 688  
Kolakofsky, Daniel, 684  
Komine, Ken-Ichi, 670  
Kooistra, Dale A., 413
- Kozak, Christine, 526, 709  
Kung, Hsing-Jien, 464
- La Monica, Nicola, 515  
Lederman, Howard M., 706  
Letvin, Norman L., 701  
Li, Jing-Po, 534  
Long, William L., 438  
Lyles, Douglas S., 678
- Machida, Curtis, 534  
Mapoles, John E., 438  
Medveczky, Peter, 714  
Mercer, John A., 497  
Meriam, Chris, 515  
Minson, Anthony C., 446, 647  
Murphy, Brian R., 697
- Naeve, Clayton W., 697
- Obalek, Slavomir, 688  
Ohshima, Kiyoshi, 490  
Ohta, Hiroaki, 670  
Okada, Hidechika, 670  
Orth, Gérard, 688
- Pillemer, Eric A., 413  
Pincus, Steven E., 638  
Poddar, Saibal K., 433  
Proietti, Enrico, 456  
Pun, Thierry, 578
- Racaniello, Vincent R., 515  
Ren, Gui-Fang, 693  
Richardson, Christopher, 684  
Richman, Douglas D., 647  
Robbins, Joan M., 709  
Roberts, Chester R., 578  
Roizman, Bernard, 629
- Schleif, William A., 438  
Shih, Ding S., 547  
Shiroki, Kazuko, 490  
Silva, Daniel P., 701  
Silver, Jonathan, 526  
Spector, Deborah H., 497, 591  
Staprans, Silvija I., 591  
Steven, Alasdair C., 578  
Stringer, Ruth A., 464  
Summers, Max D., 552, 563  
Sweet, Raymond W., 422
- Taniguchi, Hiroyuki, 670  
Tattersall, Peter, 656  
Tian, Ying C., 547  
Tjian, Robert, 539  
Tornow, Joanne, 599  
Trus, Benes L., 578  
Tsao, Hsu, 693
- Velicer, Leland F., 464  
Venkatesan, Sundararajan, 481  
Vo, Phuoc T., 585  
Vonderfecht, Steven, 706
- Waldron, Linda M., 701  
Weissman, Irving L., 413  
White, Judy, 603  
Wildy, Peter, 446  
Wimmer, Eckard, 638  
Witte, Owen N., 413
- Yamanouchi, Kazuya, 670  
Yasumoto, Shigeru, 572  
Yewdell, Jonathan W., 623  
Yolken, Robert, 706  
Yoshikawa, Yasuhiro, 670

# 1986 APPLICATION FOR FULL MEMBERSHIP IN THE AMERICAN SOCIETY FOR MICROBIOLOGY

1913 I Street, NW • Washington, DC 20006 • (202) 833-9680

COMPLETE ALL INFORMATION REQUESTED AND RETURN FORM WITH REMITTANCE IN U.S. FUNDS

**Eligibility** ASM welcomes to full membership anyone who is interested in its objectives and has a minimum of a bachelor's degree or equivalent in microbiology or a related field.

**Initiation** Memberships are initiated and renewed in January each year. Unless there are directions to the contrary, membership nominations received prior to November 1 are credited to the current year, and back issues of the selected publications for the current year are furnished, if available. Nominations received after November 1 will become effective the following January.

NAME \_\_\_\_\_  
FIRST INITIAL LAST

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_  
STATE/PROVINCE ZIP/POSTAL CODE COUNTRY

PHONE NUMBER ( ) \_\_\_\_\_ YEAR OF BIRTH \_\_\_\_\_ SEX \_\_\_\_\_

HIGHEST DEGREE \_\_\_\_\_ YEAR EARNED \_\_\_\_\_

MAJOR SUBJECT \_\_\_\_\_

GRANTING INSTITUTION \_\_\_\_\_

PRESENT POSITION \_\_\_\_\_

CURRENT SCIENTIFIC AREA \_\_\_\_\_

SIGNATURE \_\_\_\_\_ DATE \_\_\_\_\_

\*NOMINATED BY \_\_\_\_\_  
SIGNATURE OF ASM MEMBER  
 \*If you are not associated with an ASM nominating member, you can still send in this full member application form and we will contact you.

**Dues** Annual dues for 1986 are \$61.00, with \$10.00 allocated for ASM News and \$8.00 for membership services. Apply the remaining \$43.00 to subscriptions for the ASM journals at the special membership rates indicated below.

**Journals** Please check:  
 Enclosed is my dues payment (in U.S. dollars only) ..... \$61  
 Please send me the following ASM journal(s) at Member Price(s):

	U.S.	Non-U.S.	Amount
Antimicrobial Agents and Chemotherapy	\$35	\$49	\$ _____
Applied and Environmental Microbiology	35	49	_____
Molecular and Cellular Biology	41	54	_____
Infection and Immunity	41	54	_____
International Journal of Systematic Bacteriology	35	35	_____
Journal of Bacteriology	41	54	_____
Journal of Clinical Microbiology	35	49	_____
Journal of Virology	41	54	_____
Microbiological Reviews	18	29	_____

**Total Journal Fees \$** \_\_\_\_\_  
 Subtract your **\$43 Member Journals Credit** **\$ -43**  
**Subtotal** (if less than zero, enter zero) **\$** \_\_\_\_\_  
**Add your \$61 Membership Dues** **\$ +61**

**Total (Dues plus Journals).** If total is less than \$61.00, enter \$61.00 **\$** \_\_\_\_\_

PAYMENT IN U.S. DOLLARS MUST ACCOMPANY APPLICATION

A membership card, voting registration form, Placement Committee form and the journal(s) of your choice will be sent within 90 days upon completion of processing.

Dues for individual membership in ASM are tax deductible. Rates are for 1986 only.

Non-U.S. applicants remit in U.S. dollars by check or draft payable to ASM through a U.S. bank located within the Continental U.S. Applicants from Canada may use check made out in U.S. dollars and drawn on a Canadian bank.

U.S. and non-U.S. applicants may choose to pay with VISA or MasterCard. If that is your preference, please fill in the box below.

<input type="checkbox"/> VISA # <input type="checkbox"/> MASTERCARD # _____ EXPIRATION DATE _____ TODAY'S DATE _____ SIGNATURE _____ <p style="text-align: center; margin-top: 5px;">Minimum Charge \$15.00</p>
---