

# The Journal of Technology Studies

A refereed publication of *Epsilon Pi Tau* the international honor society for professions in technology.

## Publisher

Jerry Streichler

## Co-editors

Dennis Cheek and Jerry Streichler

## Board of Editors

E. Stephanie Atkinson  
University of Sunderland  
School of Education  
Hammerton Hall, Gray Rd.  
Sunderland, U.K. SR2-8JB  
stephanie.atkinson@sunderland.ac.uk

334.844.4460  
fax: 334.844.3072  
kraskamf@auburn.edu

Linda Rae Markert  
200 Poucher Hall  
State University of New York  
at Oswego  
Oswego, NY 13126-3599  
315.341.5407  
markert@oswego.edu

Wan-Lee Cheng  
Department of Design and Industry  
San Francisco State University  
1600 Holloway Ave  
San Francisco, CA 94132  
415.338.2211  
Fax: 415.338.7770  
wlcheng@sfsu.edu

Howard E. Middleton  
School of Vocational Technology  
and Arts Education  
Faculty of Education  
Griffith University  
Nathan 4111 Queensland  
Australia  
61.7.3875.5724  
fax: 61.7.3875.6868  
h.middleton@mailbox.gu.edu.au

David Devier  
University of Cincinnati  
Clermont College  
4200 Clermont College Drive  
Batavia, OH 45103  
513.732.5209  
fax: 513.732.5275  
David.Devier@uc.edu

Sam C. Obi  
Department of Technology  
San Jose State University  
One Washington Square  
San Jose, CA 95192-0061  
408.924.3218  
fax: 408.924.3198  
sobi@email.sjsu.edu

Michael J. Dyrenfurth  
Department of Industrial Technology  
Purdue University  
1410 Knoy Hall, Room 461  
West Lafayette, IN 47907-1410  
765.496.1203  
fax: 765.494.0486  
mjdyrenfurth@tech.purdue.edu

Christopher J. Shelley CMfgE  
W. L. Gore & Associates  
705 Guido Dr.  
Middletown, DE 19709  
302.598.7289  
cshelley@wlgore.com

Sharon Hart  
North Dakota State College  
of Science  
800 6th Street North  
Wahpeton, ND 58076-0002  
701.671.2221  
fax: 701.671.2145  
sharon\_hart@ndscs.nodak.edu

Xeushu Song  
Department of Technology  
Northern Illinois University  
DeKalb, IL 60115-2854  
815.753.1349  
fax: 815.753.3702  
q20xxs1@corn.cso.niu.edu

Marie Kraska  
Educational Foundations, Leadership,  
and Technology  
Auburn University  
4036 Haley Center  
Auburn University, AL 36849-5221

David Devier  
(representing the Board of Directors)

*The Journal of Technology Studies* (ISSN 1071-6084) is a publication of Epsilon Pi Tau, Incorporated, a nonprofit academic and professional honor society. Headquarters and editorial offices are located at the Technology Building, Bowling Green State University, Bowling Green, OH 43403-0305. This address or email to [jots@bgnet.bgsu.edu](mailto:jots@bgnet.bgsu.edu) should be used for all author and editorial inquiries and for purchase of copies or subscriptions. Foreign subscriptions quoted on request. Rates subject to change without notice.

Copyright 2003 by Epsilon Pi Tau, Inc.

The opinions expressed by the journal's authors are not necessarily those of the Board of Directors, staff, or members of Epsilon Pi Tau.

The scope of interests in articles and in authors is as broad as the world of technology, with members of Epsilon Pi Tau receiving the same consideration as nonmember contributors. Instructions for preparing and submitting manuscripts and a detailed description of the processes we follow in review and publication preparation are contained in the guidesheets reproduced in this issue as "Guidelines for Authors" and "Editorial Review and Procedures." Submissions that fail to comply with these will not be reviewed and will not be returned to authors.

Two issues of the journal are published each year in online versions. At the end of the year, the two issues are combined and published in a hard copy volume that is provided to subscribers and to all members who, having paid their fees and dues for that calendar year, are in good standing.

The journal is currently indexed in: Current Index to Journals of Education (USA); International Bibliography of the Social Sciences (IBSS) (UK); and the International Vocational Education and Training and Research Database (Australia).

- <http://www.ncver.edu.au>
- <http://www.EpsilonPiTauHonorary.org>
- <http://scholar.lib.vt.edu/ejournals/JTS/> (Virginia Tech's scholarly communications project)

Separate articles or complete issues are available on microform or hard copy from ProQuest Information and Learning Co., P.O. Box 1346, Ann Arbor, MI 48106-1346.

Printed in the United States by Gray Printing Company, Fostoria, Ohio.

## Staff for this Issue

### Editorial Consultants

Nancy Hoose  
Seth A. Streichler

### Office Manager

Susan Pickens

### Art & Layout

Knap Designs

## Board of Directors

### Region 1 (The nations of Europe, the Eastern Provinces of Canada, and the Northeastern United States)

Dr. Marvin Sarapin  
Department of Technology  
Kean University  
Union, NJ 07083  
908.737.3500  
fax: 908.737.3505  
msarapin@turbo.kean.edu

### Region 3 (All members-at-large, the Canadian Province of Ontario, and the North Central United States)

David Devier  
University of Cincinnati, Clermont College  
4200 Clermont College Drive  
Batavia, OH 45103  
513.732.5209  
fax: 513.732.5275  
David.Devier@uc.edu

### Region 5 (Australia, the island nations of the Pacific and Indian Oceans, the nations of Asia, the Yukon Territory and Western Provinces of Canada, and the Western United States)

James Edwards  
Department of Design & Industry  
San Francisco State University  
1600 Holloway Avenue  
San Francisco, CA 94132  
415.338.7896  
fax: 415.338.7770  
jge@sfsu.edu

### Associate Executive Director for Community and Technical Colleges

Jerry C. Olson  
Technology Building  
Bowling Green State University  
Bowling Green, Ohio 43403  
419.372.0378  
fax: 419.372.9502  
jcolson@bgnet.bgsu.edu

### Region 2 (The nations of Africa, the Caribbean Islands, and the Southeastern United States)

Robert E. Wenig  
Department of Mathematics, Science, & Technology Education  
Box 7801  
North Carolina State University  
Raleigh, NC 27695-7801  
919.515.1742  
fax: 919.515.6892  
robert\_wenig@ncsu.edu

### Region 4 (The nations of Central and South America, the Northern Territory and Central Provinces of Canada, and the Central United States)

Kennard G. Larson  
Dept. of Industrial Technology  
University of Nebraska at Kearney  
905 West 25th St.  
Kearney, NE 68849  
308.865.8504  
fax: 308.865.8976  
larsonk@unk.edu

### Associate Executive Director for Information and Communication

Dr. Dennis Cheek  
John Templeton Foundation  
5 Radnor Corp. Ctr., Suite 100  
Radnor, PA 19087  
610.687.8942  
fax: 610.687.8961  
dcheek@templeton.org

### Associate Executive Director for International Affairs

Michael Dyrenfurth  
School of Technology  
Purdue University  
Room 461, Knoy Hall  
West Lafayette, IN 47907-1410  
765.496.1203  
Fax: 765.494.0486  
mjdyrenfurth@tech.purdue.edu

### Executive Director

Jerry Streichler  
Technology Building  
Bowling Green State University  
Bowling Green, Ohio 43403  
419.372.2425  
fax: 419.372.9502  
jots@bgnet.bgsu.edu