

# Society of Toxicology Awards and Award Descriptions

In recognition of distinguished toxicologists and students, SOT presents several prestigious awards each year. In addition to receiving the award stipend and plaque, recipients are honored at a special Awards Ceremony at the SOT Annual Meeting and their names are listed in SOT publications. **The deadline for the 2004 award nominations is October 9, 2003.**

The Awards Committee reviews applications for SOT Awards and Sponsored Awards for scientists. Nominations for most of these awards must be submitted by a sponsor and a seconder who are Full members of SOT using the On-Line Award Nomination Form. The supporting documentation must indicate the candidate's achievements in toxicology and is critical in the review of each application. See the award description for the additional requirements for some of the awards, including the Sponsored Awards. The Best Paper Awards are reviewed by the Board of Publications.

Student awards, both SOT and Sponsored awards, are reviewed by the Education Committee, and application procedures are specific for each award. Other student awards are available through Regional Chapters and Specialty Sections. A student may apply for any award for which he or she is eligible and may apply for and receive multiple awards, whether SOT, Regional Chapters, or Specialty Sections sponsor the awards. Policies related to travel awards are determined by the sponsor (SOT, Regional Chapter, or Specialty Section).

Full descriptions of each award, application procedures, and names of past recipients may be found on the SOT Web site at [www.toxicology.org](http://www.toxicology.org).

## Award Descriptions



### Achievement Award

The Achievement Award is presented to a member of the Society of Toxicology who has less than 15 years experience since obtaining his/her highest earned degree (in the year of the Annual Meeting of the Society of Toxicology) and who has made significant contributions to toxicology. This award consists of a plaque and a cash stipend.

#### Award Recipients

1967	.....Gabriel L. Plaa
1968	.....Allan H. Conney
1969	.....Samuel S. Epstein
1970	.....Sheldon D. Murphy
1971	.....Yves Alarie
1972	.....Robert L. Dixon
1973	.....(No Award)
1974	.....Morris F. Cranmer
1975	.....Ian C. Munro
1976	.....Curtis D. Klaassen
1977	.....James E. Gibson
1978	.....Raymond D. Harbison



Indicates an SOT Sponsored Award

1979	.....Michael R. Boyd
1980	.....Philip G. Watanabe
1981	.....(No Award)
1982	.....Frederick P. Guengerich
1983	.....(No Award)
1984	.....Melvin E. Andersen
1985	.....Alan R. Buckpitt
1986	.....Sam Kacew
1987	.....James S. Bus
1988	.....Jeanne M. Manson
1989	.....James P. Kehrer
1990	.....Michael P. Waalkes
1991	.....Debra Lynn Laskin
1992	.....Michael P. Holsapple
1993	.....David L. Eaton
1994	.....James L. Stevens
1995	.....Lucio G. Costa
1996	.....Kenneth Ramos
1997	.....Kevin E. Driscoll
1998	.....Rick G. Schnellmann
1999	.....Michel Charbonneau
2000	.....Christopher Bradfield
2001	.....Martin Philbert
2002	.....Ruth Roberts
2003	.....Lois D. Lehman-McKeeman

# Award Descriptions (Continued)



## Arnold J. Lehman Award

The Arnold J. Lehman Award is presented to recognize an individual who has made a major contribution to risk assessment and/or the regulation of chemical agents, including pharmaceuticals. The contribution may have resulted from the application of sound scientific principles to regulation and/or from research activities that have significantly influenced the regulatory process. The nominee may be employed in academia, government, or industry and must be a SOT member. This award consists of a plaque and a cash stipend.

### Award Recipients

1980	.....Allan H. Conney
1981	.....Gabriel L. Plaa
1982	.....Gary M. Williams
1983	.....David P. Rall
1984	.....Tibor Balasz
1985	.....Frederick Coulston
1986	.....Gerrit Johannes Van Esch
1987	.....John P. Frawley
1988	.....Kundan S. Khera
1989	.....Richard H. Adamson
1990	.....Harold C. Grice
1991	.....Bernard A. Schwetz
1992	.....Roger O. McClellan
1993	.....Thomas W. Clarkson
1994	.....Bruce Ames
1995	.....Emil A. Pfitzer
1996	.....John F. Rosen
1997	.....(No Award)
1998	.....Helmut Alfred Greim
1999	.....(No Award)
2000	.....Carole A. Kimmel and Janardan K. Reddy
2001	.....Samuel M. Cohen
2002	.....Dennis Paustenbach
2003	.....Michael L. Dourson

## AstraZeneca SOT/IUTOX Fellowship

The AstraZeneca company sponsors a travel fellowship award annually through SOT and IUTOX. Three (3) fellowship awards will be available to senior scientists from a country where toxicology is underrepresented to assist with travel to attend the 2004 Society of Toxicology meeting in Baltimore, Maryland, USA, March 21–25, 2004.

### Award Recipients

2002	.....Christophor Dishovsky (Bulgaria)
	.....Zoltan Gregus (Hungary)
	.....Maritza Rojas Martini (Venezuela)
	.....Choon-Nam Ong (Singapore)
	.....W. Wasowicz (Poland)
	.....Ping-kun Zhou (China)
2003	.....Jian-Hui Liang (China)
	.....Marjan G. Vracko (Slovenia)
	.....Eman A. Seif (Egypt)

## AstraZeneca Traveling Lectureship Awards

The AstraZeneca Traveling Lectureship Awards are presented through the Society of Toxicology to recognize excellence in research and service in toxicology. AstraZeneca, Ltd., provides one or two awards annually to promote greater collaboration between European and North American toxicologists and to enable North American toxicologists to undertake a three-four week lecture tour of Europe. The awards are intended to familiarize recipients with research and regulatory issues in Europe as well as bring a North American perspective to these issues. Candidates for these awards should be established, mid-career North American scientists who are members of the Society and who demonstrate the ability to develop collaborative relationships with European colleagues. The awards are given each year in the amount of \$6,000 each.

### Award Recipients

1990	.....Robert I. Krieger, Joseph R. Landolph
1991	.....Sam Kacew
1992	.....Charles V. Smith, Jerold A. Last
1993	.....Terrence James Monks, Harihara H. Mehendale
1995	.....David L. Eaton, Hanspeter R. Witschi
1996	.....Rick G. Schnellmann, James P. Kehrer
1997	.....Lucio G. Costa, Durisala Desai
1998	.....Syed F. Ali, Curtis J. Omiecinski
1999	.....Alvaro Pugo
2000	.....Kenneth Ramos, Garold Yost
2001	.....Ronald Hines, Richard Seegal
2003	.....William D. Atchison

# Award Descriptions (Continued)



## Board of Publications

### Award

The Board of Publications Award for the *Best Paper in Toxicological Sciences* is presented to the author(s) of the best paper published in this official SOT publication during a 12-month period, terminating with the June issue of the calendar year preceding the Annual Meeting at which the award is presented. The author(s) need not be a member of the Society of Toxicology. Submissions should include a one-page summary of the paper's contribution to the science of toxicology and a copy of the article for which the nomination is being made. Any member of the Society may submit one title for consideration. In addition, the titles of no more than six papers to be considered are submitted by the editor of *Toxicological Sciences*. All papers submitted will be evaluated by the Board of Publications. This award consists of a plaque and a cash stipend. (This award was formerly known as the Frank R. Blood Award.)

### Best Paper in *Fundamental and Applied Toxicology and Toxicological Sciences*

#### Award Recipients

1995	J. L. Larson, D. C. Wolf, B. E. Butterworth
1995	M. I. Luster, C. Portier, D. G. Pait, G. J. Rosenthal, D. R. Germolec, E. Corsini, B. L. Blaylock, P. Pollock, Y. Kouchi, W. Craig, K. L. White, A. E. Munson, C. E. Comment
1996	B. C. Allen, R. J. Kavlock, C. A. Kimmel, E. M. Faustman
1997	F. L. Fort, H. Ando, T. Suzuki, M. Yamamoto, T. Hamashima, S. Sato, T. Kitazaki, M. C. Matony, G. D. Hodgen
1998	D. D. Parrish, M. J. Schlosser, J. C. Kapeghian, V. M. Traina
1999	C. A. Franklin, M. J. Inskip, C. L. Baccanale, C. M. Edwards, W. I. Manton, E. Edwards, E. J. O'Flaherty
2000	H.A Boulares, C. Giardina, C.L. Navarro, E.A. Khairallah, S.D. Cohen
2001	Jinqiang Chen, Yunbo Li, Jackie A. Lavigne, Michael A. Trush, James D. Yager
2002	M.J. Bajt, J.A. Lawson, S.L. Vonderfecht, J.S. Gujral, H. Jaeschke
2003	S. Haddad, M. Beliveau, R. Tardif, K. Krishnan

### Best Paper in *Toxicology and Applied Pharmacology*

#### Award Recipients

1995	M. F. Denny, M. F. Ware, W. D. Atchison
1996	T. A. Slotkin, C. Lau, E. C. McCook, S. E. Lappi, F. J. Seidler
1997	P. R. S. Kodavanti, T. R. Ward, J. D. McKinney, C. L. Waller, H. A. Tilson
1998	J. S. Landin, S. D. Cohen, E. A. Khairallah
1999	S. K. Ramaiah, M. G. Soni, T. J. Bucci, H. M. Mehendale
1999	C. L. Zuch, D. J. O'Mara, D. A. Cory-Slechta
2000	J.E. Staples, N.C. Fiore, D.E. Frazier, Jr., T.A. Gasiewicz, A.E. Silverstone
2001	Barbara J. Mounho, Brian D. Thrall
2002	G.S. Ratra, S.G. Kamita, J.E. Casida
2003	J. Doorn, M. Schall, D. Gage, T. Talley, C. Thompson, R. Richardson

#### Award Recipients (Frank R. Blood Award)

1974	Yves Alarie
1975	Donald J. Ecobichon, G. J. Johnstone, O. Hutzinger
1976	Richard D. Brown
1977	J. Dedinas, George D. DiVincenzo, C. J. Kaplan
1978	Perry J. Gehring, E. O. Madrid, G. R. McGowan, Philip G. Watanabe
1979	R. Fradkin, E. J. Ritter, W. J. Scott, James G. Wilson
1980	Jerold A. Last, Peter F. Moore, Otto G. Raabe, Brian K. Tarkington
1981	Yves Alarie, Martin Brady, Christine Dixon, Meryl Karol
1982	Melvin E. Andersen, Michael L. Gargas, Lawrence J. Jenkins, Jr., Robert A. Jones
1983	Henry D. Heck
1984	Erik Dybing, Sidney Nelson, Erik Soderlund, Christer Von Bahr
1985	Nobumasa Imura, Masae Inokawa, Kyoko Miura
1986	Calvin C. Wilhite, M. I. Dawson, K. J. Williams
1987	John Kao, Frances K. Patterson, Jerry Hall
1988	Debra L. Laskin, Sungchul Ji, Anne M. Pilaro
1989	R. G. Cuddihy, W. C. Griffith, Rogene F. Henderson, Joe L. Mauderly, Roger O. McClellan, M. D. Snipes, Ronald K. Wolff
1990	William P. Beierschmitt, Joseph T. Brady, John B. Bartolone, D. Stuart Wyand, Edward A. Khairallah, Steven D. Cohen
1991	Jay Babcock Silkworth, Daryl Cutler, LuAnn Antrim, Don Houston, Casimir Tumasonis, Laurence S. Kaminsky
1992	Donald A. Fox, Steve D. Rubinstein, Pauline Hsu
1993	Thomas Mably, Robert W. Moore, Robert W. Goy, Richard E. Peterson
1994	Susan J. Borghoff, William H. Lagarde

# Award Descriptions (Continued)

## Colgate-Palmolive Post-Doctoral Fellowship Award in *In Vitro* Toxicology

The Colgate-Palmolive Company sponsors the Colgate-Palmolive Post-Doctoral Fellowship Award in *In Vitro* Toxicology through the Society of Toxicology to advance the development of alternatives to animal testing in toxicological research. The award is given in alternate years and includes stipend and research-related costs (up to \$33,500) for one year. The award may be extended for an additional year upon agreement between Colgate-Palmolive and the post-doctoral fellow. Post-doctoral trainees in their first year of study beyond the Ph.D., M.D. or D.V.M. degree who are employed by academic institutions, federal/national laboratories or research institutes worldwide may apply. The Education Committee reviews applications, which are due in even calendar years, and the fellowship is awarded for the following year. The next application deadline: October 9, 2004.

### Award Recipients

1988	Ernest Bloom
1989	Gin Hsieh
1990	Dennis E. Chapman
1991	Anne Walsh
1992	Qin Chen
1993	Erika Cretton
1994	William Chan
1995	Bob Van de Water
1997	Alan Parrish
1999	Russell Thomas
2001	Kevin Kerzee, Christopher Reilly
2002	Kevin Kerzee
2003	Kimberly Miller

## Colgate-Palmolive/SOT Awards for Student Research Training in Alternative Methods

The purpose of the Colgate-Palmolive/SOT Awards for Student Research Training in Alternative Methods is to enhance student research training using *in vitro* methods or alternative techniques to reduce, replace or refine use of animals in toxicological research. The Education Committee will present the awards to graduate students or to institutions that provide research internships. Up to six awards, at \$2,500 each, are available. Applications received after October 9 will be accepted until all funds are committed.

**Graduate Students:** The award will help to defray expenses for graduate students in toxicology to visit an off-site laboratory for the purpose of gaining knowledge about and developing *in vitro* or alternative toxicology techniques that will support the student's dissertation research. The overall goal of this program is to support the replacement, reduction or refinement of currently used animal models in toxicology research and testing.

**Institutions:** Awards will also be made to institutions that propose a 10-week research experience for students (at any level) involving *in vitro* toxicology or alternative methods to reduce, replace, or refine, the use of animals in toxicology research.

### Award Recipients

2000	Jason Gross
2001	Jason Biggs, Victoria Richards
2002	Kartik Shankar, Chad M. Vezina, and Ryan L. Williams
2003	Sachin Devi, Midhun Korrapati, and Pallavi Limaye

# Award Descriptions (Continued)

## Colgate-Palmolive Traveling Lectureship in Alternative Methods in Toxicology Award

The Colgate-Palmolive Company sponsors the Colgate-Palmolive Traveling Lectureship in Alternative Methods in Toxicology Award annually through the Society of Toxicology. This award covers expenses for an individual scholar to visit institution(s) for the dissemination of knowledge and for stimulating research that takes advantage of modern *in vitro* toxicology approaches. The overall goal of this program is to make scientists aware of the benefits of modern *in vitro* toxicology approaches and to stimulate research for the replacement, reduction or refinement of currently used animal models. The scholar may be asked to make a special presentation at the SOT Annual Meeting.

Lecturing scholars should be established, mid-career through late-career scientists who are members of SOT and who are developing collaborative relationships with scientists at other institutions.

Requests for funds can be made by the individual scholar or by organizations such as universities, colleges, SOT Specialty Sections and SOT Regional Chapters, and other toxicology organizations that are interested in inviting the scholar. Up to \$15,000 is available. The Awards Committee reviews the applications, which must be accompanied by a statement of the applicant's experience, a brief overview of the techniques to be discussed in the lecture, and a letter from the hosting institution(s) indicating their interest in serving as host and the potential benefits to the institution.

### Award Recipients

1996 .....University of Mississippi Medical Center  
Visiting Professor: .....Tetsuo Satoh  
1996 .....University of Illinois at Urbana  
Visiting Professor: .....Julio Davila  
1996 .....Mississippi State University  
Visiting Professor: .....Michael Holsapple  
1996 .....Washington State University  
Visiting Professor: .....Daniel Acosta  
1997 .....Indiana University School of Medicine  
Visiting Professor: .....A. Jay Gandolfi  
1997 .....University of Arizona Health Science Center  
Visiting Professor: .....Kevin E. Driscoll  
1997 .....University of New Mexico Health Sciences Center  
Visiting Professor: .....Sam Kacew  
1997 .....University of Illinois  
Visiting Professor: .....Michael Denison  
1998 .....University of Washington  
Visiting Professor: .....Bruce Fowler  
1998 .....San Diego State University  
Visiting Professor: .....Leigh Ann Burns Naas  
1999 .....San Diego State University  
Visiting Professor: .....Robert Chapin  
2000 .....Yale University, School of Medicine  
Visiting Professor: .....Narendra Singh

2001 .....Medical College of Wisconsin  
Visiting Professor: .....Garold Yost  
2003 .....Washington State University  
Visiting Professor: .....Marc W. Fariss



## Contributions to Public Awareness of the Importance of Animals in Toxicology Research Award

The Contributions to Public Awareness of the Importance of Animals in Toxicology Research Award is presented annually to an individual (or organization) in recognition of the contributions made to the public understanding of the role and importance of experimental animals in toxicological science. This award may be for either a single seminal piece of work or a longer-term contribution to public understanding of the necessity of the use of animals in toxicological research both to ensure and enhance the quality of human and animal health and the environment. The award consists of a plaque and a cash stipend.

### Award Recipients

2000 .....Allegheny-Erie Chapter  
2001 .....Massachusetts Society for Medical Research  
2002 .....George Nethercutt  
2003 .....Michael Derelanko



## Distinguished Lifetime Toxicology Scholar Award

The Distinguished Toxicology Scholar Award is presented to a member of SOT who has made substantial and seminal scientific contributions to the discipline of toxicology. The prime consideration for this award is scientific accomplishments and not necessarily service to the Society. This award consists of a plaque and a cash stipend. (This award was formerly known as the Scientific Achievement Award.)

### Award Recipients

2003 .....Henry C. Pitot

### Award Recipients (Scientific Achievement Award)

2001 .....James E. Troska

# Award Descriptions (Continued)



## Education Award

The Education Award is presented to an individual who is distinguished by the teaching and training of toxicologists and who has made significant contributions to education in the broad field of toxicology. This award consists of a plaque and a cash stipend.

### Award Recipients

1975	.....Harold C. Hodge
1976	.....Ted A. Loomis
1977	.....Robert B. Forney
1979	.....Sheldon D. Murphy
1980	.....Herbert H. Cornish
1981	.....Frederick Sperling
1982	.....Lloyd W. Hazleton
1983	.....Julius M. Coon
1984	.....Frank Guthrie, Ernest Hodgson
1985	.....William B. Buck
1986	.....Robert I. Krieger
1987	.....Gabriel L. Plaa
1988	.....John Autian
1989	.....Tom S. Miya
1990	.....Charles H. Hine
1991	.....Hanspeter R. Witschi
1992	.....Dean E. Carter
1993	.....Curtis D. Klaassen
1994	.....Robert A. Neal
1995	.....William Carlton
1996	.....Robert Snyder
1997	.....Albert E. Munson
1998	.....David J. Holbrook
1999	.....Jules Brodeur
2000	.....Gary Carlson
2001	.....Harihara Mehendale
2002	.....Joseph Borzelleca
2003	.....Frederick W. Oehme



## Enhancement of Animal Welfare Award

The Enhancement of Animal Welfare Award is presented annually to a member of the Society in recognition of the contribution made to the advancement of toxicological science through the development and application of methods that replace, refine, or reduce the need for experimental animals. This award recognizes outstanding/significant contributions made by members of the Society of Toxicology to the scientifically sound and responsible use of animals in research. The achievement recognized may be either a seminal piece of work or a long-term contribution to toxicological science and animal welfare. The award consists of a plaque and a cash stipend.

### Award Recipients

2000	.....Yves Alarie
2001	.....Alan Goldberg
2002	.....Gary Williams
2003	.....G. Frank Gerberick, Ian Kimber

## Graduate Student Fellowship Awards

The Graduate Student Fellowship Awards are provided by generous sponsors and are open to student members of the SOT engaged in full-time graduate study towards a Ph.D. degree in toxicology. The major professor must be a SOT member. The Education Committee's evaluation is based primarily on originality of the dissertation research, research productivity, relevance to toxicology, scholastic achievement, and letters of recommendation. Finalists are interviewed at the Annual Meeting and receive travel support.

## Covance Corporation Graduate Fellowship

### Award Recipients

1984	.....Patricia Ganey
1985	.....Kevin Gaido
1986	.....Lisa Naser
1987	.....Marjorie Romkes
1988	.....Caroline J. Decker
1989	.....Lorraine E. Twerdok
1991	.....Dale Morris
1993	.....Michael F. Denny
1995	.....Michael DiMatteo
1998	.....Rebecca Laposa
2000	.....Susan McKarns
2001	.....Kirsten Fertuck
2002	.....Edward Williams
2003	.....Winnie Jeng

## Novartis Corporation Graduate Fellowship

### Award Recipients

1989	.....Timothy Zacharewski
1990	.....Mary Suzanne Stefaniak
1991	.....Donald Bjerke
1992	.....Lhanoo Gunawardhana
1993	.....Christopher Martenson
1994	.....Nyla Harper
1995	.....Heather E. Kleiner
1996	.....Russell Thomas
1997	.....Melva Rios-Blancos
1998	.....Kent Carlson
1999	.....Mark Hickman
2000	.....Jeffrey Moran
2001	.....Vishal Vaidya
2002	.....Kartik Shankar
2003	.....Sachin Devi

# Award Descriptions (Continued)



## Graduate Student Travel

### Awards

Graduate Student Travel Awards defray expenses for students presenting platform talks or posters at the SOT Annual Meeting. To be eligible, the student must be a SOT member (or have submitted a membership application), who has not previously received a graduate student travel award. Each institution may rank and submit applications from up to three students.



## Honorary Membership

The Society of Toxicology recognizes non-members who embody outstanding and sustained achievements in the field of toxicology with the Honorary Member Award. Candidates are nominated by two voting or associate members of the Society. Seconding letters and information regarding career achievements in toxicology should accompany the nomination. A two-thirds vote of Council determines recipients, with not more than two Honorary Members elected during any one term of Council. Nominations should be sent to SOT Headquarters.

### Inductees

..... Bernard B. Brodie\*  
 ..... Ethel Browning\*  
 ..... John E. Casida  
 ..... Jud Coon  
 ..... Gertrude B. Elion\*  
 ..... Ronald W. Estabrook  
 ..... George H. Hitchings\*  
 ..... Eugene M.K. Geiling\*  
 ..... Charles S. Lieber  
 ..... Michel Mercier  
 ..... Herbert Needleman  
 ..... Norton Nelson\*  
 ..... W. F. Von Oettingen\*  
 ..... Sten G. Orrenius  
 ..... Dennis Parke  
 ..... Herbert Remmer  
 ..... William O. Robertson  
 ..... Findlay Russell  
 ..... Roger W. Russell\*  
 ..... Torald H. Sollman\*  
 ..... Takashi Sugimura  
 ..... Wendell W. Weber  
 ..... R. Tecwyn Williams\*  
 ..... Hyman J. Zimmerman\*

\* Deceased



## Merit Award

The Merit Award is presented to a member of the Society of Toxicology in recognition of a distinguished career in toxicology. This award consists of a plaque and a cash stipend.

### Award Recipients

1966 ..... Henry F. Smyth, Jr.  
 1967 ..... Arnold J. Lehman  
 1968 ..... R. T. Williams  
 1969 ..... Harold C. Hodge  
 1970 ..... Don D. Irish  
 1971 ..... Kenneth P. DuBois  
 1972 ..... O. Garth Fitzhugh  
 1973 ..... Herbert E. Stokinger  
 1974 ..... William B. Deichmann  
 1975 ..... Frederick Coulston  
 1976 ..... Verald K. Rowe  
 1977 ..... Harry W. Hays  
 1978 ..... Julius M. Coon  
 1979 ..... David W. Fassett  
 1980 ..... Bernard L. Oser  
 1981 ..... John H. Weisburger  
 1982 ..... Harold M. Peck  
 1983 ..... Perry J. Gehring  
 1984 ..... Tom S. Miya  
 1985 ..... Carrol S. Weil  
 1986 ..... Ted A. Loomis  
 1987 ..... Bo Holmstedt  
 1988 ..... Seymour L. Friess  
 1989 ..... Wayland J. Hayes, Jr.  
 1990 ..... Sheldon D. Murphy  
 1991 ..... Toshio Narahashi  
 1992 ..... W. Norman Aldridge  
 1993 ..... John Doull  
 1994 ..... Ernest Hodgson  
 1995 ..... Robert A. Scala  
 1996 ..... Gabriel L. Plaa  
 1997 ..... Mary O. Amdur  
 1998 ..... John A. Thomas  
 1999 ..... Thomas Clarkson  
 2000 ..... Philippe Shubik  
 2001 ..... Donald Reed  
 2002 ..... Bernard Schwetz  
 2003 ..... M.W. Anders

# Award Descriptions (Continued)



## Minority Undergraduate Student and Advisor Awards

The Minority Undergraduate Student and Advisor Awards provide support for awardees to participate in the Undergraduate Education Program at the SOT Annual Meeting. This program is an introduction to the discipline of toxicology for undergraduate science majors and includes an orientation, a special poster session with scientists, and activities with a SOT mentor. The travel awards are for those from races and ethnic groups under-represented in the sciences (African American, American Indian or Hispanic American) and for their advisors. Advisors are eligible regardless of racial or ethnic background. Meeting registration and support for travel, lodging, and meals are provided for students and advisors who are not local to the meeting site. Students and advisors from local institutions receive meeting and program registration and meals. The program is supported in part by NIH-MARC, Pfizer, and Johnson & Johnson.



## Public Communications Award

The Public Communications Award is presented by the Society of Toxicology to recognize an individual who has made a major contribution to broadening the awareness of the general public on toxicological issues through any aspect of public communications. The award should reflect accomplishments made over a significant period of time. Examples of qualifying media in which the nominated communication may appear are: books, brochures, continuing education courses, data bases, extension bulletins, magazines, newspapers (local or national), public presentations, public forums, radio and television scripts, and workshops. The award consists of a plaque and a cash stipend.

### Awards Recipients

1994	.....Michael A. Kamrin
1995	.....Philip Abelson
1996	.....Bruce N. Ames
1997	.....Audrey Gotsch
1999	.....Ann de Peyster
2001	.....Anna Shvedova
2002	.....Sam Kacew
2003	.....Charlene A. McQueen



## Regional Chapter Awards

Most SOT Regional Chapters provide awards to recognize outstanding students or scientists. Application requirements and deadlines vary. Visit the Regional Chapter or Awards and Fellowship sections on the SOT Web site for full details.

## Robert L. Dixon International Travel Award

The Robert L. Dixon Award, sponsored by the Toxicology Education Foundation, takes applications from graduate students in the area of reproductive toxicology. The award carries a stipend for travel costs to enable a student to attend the International Congress of Toxicology meeting. It is available every three years. (Next application date is October 9, 2003.)

### Award Recipients

1989	.....Kevin L. Stark
1992	.....Daland Richard Juberg
1995	.....Xuelin Li
1998	.....Jeeyeon Bee
2001	.....Mark Fielden



## Society of Toxicology/ American Chemistry Council Early Career Award

The American Chemistry Council offers an Early Career Award through the Society of Toxicology. The award is up to \$100,000 and is designed to encourage persons beginning their professional careers to conduct research that will improve the scientific basis for risk assessment and decision making with respect to a particular specialty area of potential toxicity of chemicals. Awards have been offered in Inhalation and Neurotoxicology. Full details are available on the SOT Web site.

### Award Recipients

2002	.....Ronald Tjalkens (Inhalation)
2003	.....Ilona Jaspers (Neurotoxicology)



## Specialty Section Student Awards

Most SOT Specialty Sections provide awards to recognize outstanding student presentations at the SOT Annual Meeting. Application requirements and deadlines vary. For more details refer to the Award descriptions on the SOT Web site at [www.toxicology.org](http://www.toxicology.org), under Specialty Sections or the Awards and Fellowships sections

## 2003

*In recognition of distinguished toxicologists and students, SOT presents several prestigious awards each year. Award recipients receive a plaque and a generous stipend, are listed in the annual Membership Directory, posted on the SOT Web site and are honored at a special Awards Presentation at the SOT Annual Meeting.*

The Society of Toxicology presented the following awards for the year 2003:

### Achievement



*Lois D. Lehman-McKeeman*

The Awards Committee of the Society of Toxicology is honored to have unanimously selected Dr. Lois Lehman-McKeeman as the recipient of the 2003 Achievement Award for significant contributions to the field of toxicology.

Dr. Lehman-McKeeman received her undergraduate degree in Toxicology from the Philadelphia College of Pharmacy and Science and subsequently a Ph.D. from the University of Kansas Medical Center in 1986. Following her graduate work she joined Procter and Gamble Company as a Biochemical Toxicologist, rising through the ranks to Principal Research Scientist. In 2001, Dr. Lehman-McKeeman joined Bristol-Myers Squibb Company where she is presently Research Fellow in Investigative Toxicology.

The importance of Dr. Lehman-McKeeman's scientific contributions have been internationally recognized for being directed towards investigating mechanisms by which chemicals cause toxicity and cancer in animals and the use of this information for evaluating human risk. Dr. Lehman-McKeeman has published extensively in and contributed significantly to the understanding of molecular mechanisms and the species specificity of  $\alpha$ 2u-globulin-mediated renal carcinogenesis. Her research in this area was critical for elucidating the mechanism by which chemicals cause this protein to accumulate in the male rat kidney and establishing the lack of human relevance of this syndrome. She has also expanded her research efforts to pursue biochemical and molecular mechanisms of rodent liver carcinogenesis and cell-specific lung toxicity and carcinogenesis. In many cases the scientific information she generated and published has guided regulatory policy in a highly politicized setting.

Dr. Lehman-McKeeman has also actively participated in service-related activity for SOT. She was first a member and then chairperson of the Continuing Education Committee, Director of the Placement Committee, and elected to serve as member of Council. She was also an Associate Editor of *Toxicological Sciences* until recently when she was named as Editor of the journal. Dr. Lehman-McKeeman has also participated on a number of advisory groups in which she was always a key contributor.

Dr. Lehman-McKeeman continues to make significant contributions to mechanistic toxicology using technological advances in both chemistry and molecular biology and is well deserving of this Award.

### Arnold J. Lehman



*Michael L. Dourson*

Dr. Michael Dourson is internationally known for research, risk assessment and toxicology expertise, and leadership in developing scientific principles for chemical assessment and regulation. He founded Toxicology Excellence for Risk Assessment, a nonprofit corporation dedicated to the best use of toxicity data for estimating risk assessment values.

Dr. Dourson, Diplomate and past President of the American Board of Toxicology, has published over 70 risk assessment papers, 100-plus government risk assessment documents, and gave over 100 invited presentations.

Dr. Dourson held leadership roles at EPA, winning 4 Bronze medals. He chaired EPA's RfD Work Group, was a charter member of EPA's Risk Assessment Forum, and

# Award Winners 2003 (Continued)

## Board of Publications Best Paper Awards:

### *Toxicology and Applied Pharmacology*

*Identification of Butyrylcholinesterase Adducts after Inhibition with Isomalathion Using Mass Spectrometry: Difference in Mechanism Between (1R) – and (1S) – Stereoisomers.* J. Doorn, M. Schall, D. Gage, T. Talley, C. Thompson, and R. Richardson. *TAAP* 176, 73–80, 2001.

In the work by Doorn et al. (2001), the authors explore the role of adduct formation in the inhibition of cholinesterases by malathion, a major component of the toxicity of this organophosphorus pesticide. The chemical activation of malathion produces potent inhibitors of cholinesterases, while thermal or photochemical isomerization of the pesticide can produce racemic isomalathion. By mass spectrometry, the authors find that isomer-specific cholinesterase adducts account for isomalathion inhibition of the enzyme. Furthermore, they demonstrate a difference in the mechanism of inactivation between specific isomers. The differences in the adducts appears to contribute to the aging process of this biochemical lesion, where the enzyme can no longer be reactivated. The work is elegantly done and directly addresses a toxic mechanism at the molecular level.

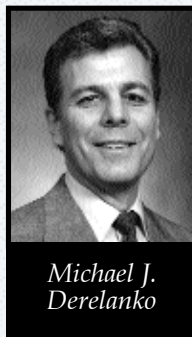
### *Toxicological Sciences*

*A PBPK Modeling-Based Approach to Account for Interactions in the Health Risk Assessment of Chemical Mixtures.* S. Haddad, M. Beliveau, R. Tardif, and K. Krishnan. *ToxSci* 63, 125–131, 2001.

Haddad et al. (2001) presented a novel risk assessment methodology for chemical mixtures that accounts for the consequences of pharmacokinetic interactions among components. The authors used physiologically-based pharmacokinetic (PBPK) interaction models to simulate the change in tissue dose of chemicals during mixed exposures. The change in tissue dose of mixture components was used along with their "tissue dose-response" relationship to characterize the ensuing risk. Using this approach, an interaction-based hazard index was developed for mixtures of systemic toxicants whereas an interaction-based response addition was performed for mixtures of carcinogens. The applicability of these approaches was demonstrated by characterizing the change in tissue dose of toxic moiety of mixture components according to interaction mechanism and exposure concentrations. For various mixtures of volatile organic chemicals, such information was then used to characterize health risk resulting from mixed exposures.

The methodological approaches developed in this article facilitate, for the first time, the consideration of the impact of multichemical pharmacokinetic interactions at a quantitative level in mixture risk assessments.

## Contributions to Public Awareness of the Importance of Animals in Toxicology Research



Michael J.  
Derelanko

For the past 20 years, Dr. Michael J. Derelanko has been a consistent advocate of the importance of educating the public about the importance of animals in toxicological research and about the concepts of toxicology and dose-response relationships. Dr. Derelanko's audiences have ranged widely and include elementary, middle, and high school students, adults, and colleagues. His service to the North Jersey Regional Science Fair Committee and on the New Jersey Association for Biomedical Research has allowed him to address a range of audiences about the importance of animal research in toxicology. Dr. Derelanko has organized symposia and published papers about animals in research. Finally, Dr. Derelanko has influenced others in toxicology to talk with the public about animal research.

## Distinguished Lifetime Toxicology Scholar



Henry C.  
Pitot

Dr. Henry Pitot has been selected to receive the 2003 Distinguished Lifetime Toxicology Scholar Award for his substantial and seminal scientific contributions to the discipline of toxicology. Dr. Pitot is currently Professor Emeritus of Oncology and Pathology and Laboratory Medicine at the University of Wisconsin. He received both his M.D. and Ph.D. in Biochemistry from Tulane University after graduating from Virginia Military Institute. He completed post-doctoral training at the McArdle Laboratory at the University of Wisconsin and started his academic career in the Department of Pathology at the University of Wisconsin. Dr. Pitot ascended the professorial ranks at the University of Wisconsin and has served the University in many capacities throughout his career from Chairman of Pathology to the Director of the McArdle Laboratory for Cancer Research.

## Award Winners 2003 (Continued)

Dr. Pitot's research interests have been directed towards understanding the multistage process of chemical carcinogenesis using morphological and biochemical approaches. He published his first two papers in 1954 and has since published over 500 high-quality and frequently-cited scientific papers. He is well known for his identification of the various stages in hepatocarcinogenesis that have provided models for both genotoxic and nongenotoxic carcinogens. His characterization of the heterogeneous nature of hepatic foci and methods for quantifying the number and size of these precursor lesions allowed the quantitative assessment of initiating and promoting potential of different chemicals. This work has had significant impact on regulatory agencies and public policy to benefit more accurate cancer risk assessment. He continues to make major contributions by incorporating molecular biology and the development and use of transgenic animals as tools in his investigations.

In addition to Dr. Pitot's outstanding research career, he serves the toxicology, pathology, and cancer research communities as a mentor, reviewer, and advisor. He is a great scholar and teacher who has encouraged and mentored many young investigators in these fields and is highly deserving of the Distinguished Lifetime Toxicology Scholar Award.



Frederick W.  
Oehme

### Education

Dr. Frederick W. Oehme, Professor of Toxicology, Pathobiology, Medicine and Physiology in the College of Veterinary Medicine at Kansas State University, has been selected as the 2003 Educator Award winner.

Dr. Oehme has been an important and continuing part of toxicological education for many years. His efforts extend from his university, to SOT, and beyond to the international arena. His early efforts in building the graduate training program in toxicology at Kansas State are noteworthy as is his mentoring of over sixty graduate and post-doctoral students. The success of these students in examinations for accreditation by the American Board of Toxicology and/or the American Board of Veterinary Toxicology as well as in their subsequent careers is a fitting tribute to his efforts.

Dr. Oehme's strong interest in continuing education and in SOT led him in 1980 to propose, organize, and present in 1980 the first SOT Continuing Education course. In the 23 years since then the Society's Continuing Education Courses have become a valuable source of information for toxicologists and an important part of SOT Annual Meetings. Concern with professional standards in toxicology led to Dr. Oehme's involvement in the establishment of the American Board of Toxicology,

including chairing the initial Constitution and By-Laws Committee and subsequent service on the Executive Committee. In the international arena he has been involved with training activities in many countries and has served as a toxicology consultant to FAO and WHO for the development of poisoning prevention programs around the world.

In summary, it can be said that Dr. Oehme's contributions to toxicology education have been many and varied and the result of a deep and abiding commitment. His impact on toxicology has been, and continues to be, important and valuable.



G. Frank  
Gerberick



Ian  
Kimber

### Enhancement of Animal Welfare

The 2003 Enhancement of Animal Welfare Award has been awarded to Dr. Ian Kimber and Dr. G. Frank Gerberick. They have been active in the field of toxicology for over 20 years, and they are both the authors or co-authors of over 300 publications on the subject of predictive testing in immunology.

G. Frank Gerberick and Ian Kimber recently sponsored the Murine Local Lymph Node Assay for review by the Inter-Agency Coordinating Committee for the Validation of Alternative Methods Peer Review Panel. The panel unanimously recommended that, with appropriate qualifications, the Local Lymph Node Assay was at least as accurate as current guinea pig methods for the hazard identification of strong to moderate chemical sensitizing agents and offered "several advantages with respect to animal use refinement compared to conventional guinea pig methods in that it involves less pain and distress." As a consequence, this assay is now accepted by many regulatory bodies, including the U.S. Food and Drug Administration, as a valid predictor of immune sensitization.

The Local Lymph Node Assay is an *in vivo* assay, which enhances the welfare of the laboratory animal by reduction of distress without compromise of data quality. This is a key goal of all scientists truly interested in animal welfare, while recognizing the need for their continued use.

# Award Winners 2003 (Continued)

## Merit



*M. W.  
Anders*

Dr. M. W. "Drag" Anders is the recipient of the 2003 Merit Award. Drag is considered by his peers to be among a select group whose research in the field of drug and chemical bioactivation can be considered "distinguished." His work on the bioactivation, covalent binding, and toxicity of halogenated hydrocarbons is arguably the definitive body of work. When Drag entered research, the covalent binding hypothesis of toxicity was in

its infancy, and the focus of the field was to elucidate the nature of the biologically reactive intermediates. In the 1970s, he carried out some of the earliest work on chloroform, dichloromethane, and carbon tetrachloride that actually proved the hypothesis by linking the biological response of the parent compound to the chemistry through the unequivocal structural identification of the reactive intermediates. He used his chemical knowledge to push electrons and with various techniques proved the nature of the involvement of reactive species in toxicity. This rigorous proof of mechanism through elegant and original experimental science coupled to a commitment to excellence in research is what has distinguished Drag's work throughout his career in toxicology. Drag has received a number of prestigious awards including the Bernard B. Brodie Award in Drug Metabolism and a MERIT (Method to Extend Research in Time) award from NIEHS. He has received and held distinguished chairs and lectureships positions as well as serving as the Chair of the Department of Pharmacology and then the Department of Pharmacology and Physiology after merger of these two departments at the University of Rochester. He has served in various advisory capacities in recognition of his stature in the field of toxicology. Drag's career is also distinguished by his record of training many outstanding students. Thus, Drag's career is truly distinguished, in his research, training, and service and most importantly in his character and personality.

## Public

## Communications



*Charlene A.  
McQueen*

Dr. Charlene McQueen has enjoyed a stellar career in toxicological research and teaching. At this time, however, she is being recognized as a leading communicator of toxicology to the general public as the recipient of the 2003 Public Communications Award. Her efforts in this regard have been extensive, many of them through SOT programs, others through the University of Arizona.

The former include service on the K-12 Education Subcommittee, as well as participating in and obtaining NIEHS support for SOT-sponsored teacher training workshops. The latter include service as Director of Community Outreach and Education of the University of Arizona Health Sciences Center. Her use of web-based programs has communicated toxicological information and the basic concepts of toxicology to people in all parts of the world.

Congratula  
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the 2003  
award win-  
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## 2003 Award Winners (Continued)

### American Chemistry Council Early Career Award in Inhalation Toxicology



The 2003 Early Career Award in Inhalation Toxicology is presented to Dr. Ilona Jaspers, Assistant Professor in the Department of Pediatrics, Division of Infectious Diseases, University of North Carolina at Chapel Hill. Dr. Jaspers' Award, which is the second of its kind to be awarded through SOT, will be used to

support work under her proposal "Diesel-Induced Alterations of Influenza Pathogenesis." This work will seek to establish whether exposure to diesel exhaust particles renders airway epithelial cells more susceptible to influenza-induced pro-inflammatory responses and thus enhances the pathogenesis associated with influenza infections. In addition, this project will determine whether antiviral defense responses of airway epithelial cells are compromised by prior exposure to diesel exhaust particles, leading to an advantage of the invading virus over the host defense system. Dr. Jaspers obtained her Bachelor of Science degree in Biology at Seton Hall University, and was an NIEHS Pre-Doctoral Fellow at New York University where she earned her Ph.D. in Toxicology in 1997 under Dr. Lung Chi Chen. From 1997 to 1999, she was a Post-Doctoral Fellow with the Center of Environmental Medicine and Lung Biology at the University of North Carolina at Chapel Hill, working with Dr. James M. Samet and Robert B. Devlin from the U.S. EPA Human Studies Division. From 1999 to 2000 Dr. Jaspers was a Research Associate with the Center of Environmental Medicine and Lung Biology and obtained her faculty appointment in the Department of Pediatrics, Division of Infectious Diseases in the summer of 2000.

This Early Career Award in Inhalation Toxicology—sponsored by the Long-Range Research Initiative of the American Chemistry Council and administered through the Society of Toxicology—is provided to encourage persons beginning their professional careers to conduct research on topics related to inhalation.

### AstraZeneca Traveling Lectureship



The experience and accomplishments in neurotoxicology of Dr. William D. Atchison, Professor of Pharmacology and Toxicology at Michigan State University, make him an excellent fit for the role of 2003 AstraZeneca Traveling Lecturer. His experience in the classroom and in cutting-edge research make clear that both the style and substance of the lectures will be a pleasure to the audiences.

The well-planned lecture itinerary will provide ample opportunities for scientific communication. The overall impact of Dr. Atchison's lecture tour will bring credit to him, to AstraZeneca, and to SOT.

### Colgate-Palmolive Traveling Lectureship in Alternative Methods in Toxicology



This year's recipient of the Colgate-Palmolive Traveling Lectureship in Alternative Methods in Toxicology is Dr. Marc W. Fariss. Dr. Fariss is

Associate Professor of Pharmaceutical Sciences and Pharmacotherapy at Washington State University. For his Traveling Lectureship, Dr. Fariss will spend several weeks with the Toxicology Program in the Department of Environmental Health at the University of Washington. Over the past decade, Dr. Fariss has developed novel *in vitro* techniques for determining the susceptibility of tissue to lipid peroxidation and mitochondrial oxidative damage. While at the University of Washington, he plans to work closely with Dr. Terrance Kavanagh to apply these *in vitro* techniques to study the role of mitochondrial antioxidants and mitochondrial oxidative damage in oxidative stress-induced toxicity. He will also provide some guest lectures in a Current Topics in Toxicology course at the UW, as well as provide a Departmental Seminar on his *in vitro* techniques.

## Colgate-Palmolive Post-Doctoral Fellowship in In Vitro Toxicology



**Recipient:**  
Kimberly Miller

**University of  
Maryland School  
of Medicine**

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## Graduate Student Fellowships

Novartis Corporation  
Graduate Fellowship



**Recipient:**  
Sachin Devi

**University of  
Louisiana at  
Monroe**

Covance Corporation  
Graduate Fellowship



**Recipient:**  
Winnie Jeng

**University of  
Toronto**

*Are you or someone you know a student who is eligible for an award?  
The deadline for the 2004 award nominations is October 9, 2003.*

*Visit the Web site for details and forms:*

**[www.toxicology.org/Information/AwardsFellowships/awards.html](http://www.toxicology.org/Information/AwardsFellowships/awards.html)**

# 2003 Fellowship and Travel Award Winners

## 2003 SOT Graduate Travel Award Recipients

<b>Maen Abdelrahim</b> .....Texas A&M University	<b>Kai H. Liao</b> .....Colorado State University
<b>Adebowale Abebiyi</b> .....National University of Singapore	<b>Linda L. Manza</b> .....University of Arizona
<b>Erika L. Abel</b> .....University of Washington	<b>Kametra J. Matthews</b> .....Louisiana State University
<b>Anita F. Austin</b> .....Meharry Medical College	<b>Prosper M'Bemba-Meka</b> .....Université de Montréal, .....Faculté de Médecine
<b>Angelica Becaria</b> .....University of California Irvine	<b>Geniece P. McCollum</b> .....University of Rochester
<b>James R. Blattner</b> .....University of North Carolina	<b>Robert J. Mitkus</b> .....University of Maryland
<b>Carolyn J. Broccardo</b> .....Colorado State University	<b>Jose L. Morales</b> .....Penn State University
<b>Stacey L. Brower</b> .....West Virginia University	<b>Adrian Nanez</b> .....Texas A&M University
<b>Susan C. N. Buist</b> .....University of Kansas Medical Center	<b>Steffan T. Nawrocki</b> .....University of Texas - Houston
<b>Andrew D. Burdick</b> .....University of New Mexico	<b>Sharon L. Oxendine</b> .....University of North Carolina
<b>Iris A. Camacho</b> .....Virginia Commonwealth University	<b>Seongmi Park</b> .....University of North Dakota
<b>Jennifer S. Carew</b> .....University of Texas Medical Branch	<b>Niti N. Patel</b> .....University of Sciences in Pennsylvania
<b>Clara Y.Y. Chan</b> .....Queen's University	<b>Santosh Phadke</b> .....Long Island University
<b>Yamini Chandrasekaran</b> .....University of Texas at Austin	<b>Andrew J. Phimister</b> .....University of California Davis
<b>Li Chen</b> .....Rutgers University	<b>Isabelle Plante</b> .....Université du Québec
<b>Elena S. Craft</b> .....Duke University	<b>Paul C. Porter</b> .....University of Louisville
<b>Janelle S. Crossgrove</b> .....University of Kentucky	<b>Amy L. Prasch</b> .....University of Wisconsin - Madison
<b>Kaluhath N. DeAbrew</b> .....University of Wisconsin - Madison	<b>Thitiya Pung</b> .....Virginia Tech
<b>Zachary E. Derbyshire</b> .....University of Arizona	<b>Jodie M. Reed</b> .....Indiana University School of Medicine
<b>Vamsidhara C. Dhulipala</b> .....University of Missouri	<b>John F. Reichard</b> .....University of Colorado
<b>Shashank Dravid</b> .....University of Georgia	<b>Clint A. Rosenfeld</b> .....University of Medicine & Dentistry of .....New Jersey
<b>Joshua R. Edwards</b> .....Michigan State University	<b>Randal J. Schneider</b> .....University of Michigan, Ann Arbor
<b>Aimen K. Farraj</b> .....Michigan State University	<b>Rosemary A. Schuh</b> .....University of Maryland
<b>Melissa C. Garofolo</b> .....Duke University	<b>Sumit J. Shah</b> .....University of Louisiana at Monroe
<b>Yokabet Gedeon</b> .....Texas Southern University	<b>Jing Shao</b> .....University of Washington
<b>Mette G. Goodin</b> .....University of Otago	<b>David J. Smith</b> .....Indiana University School of Medicine
<b>Volkan M. Gurel</b> .....University of North Dakota	<b>Danyel P.H. Tacker</b> .....University of Texas Medical Branch
<b>Kristen E. Harring</b> .....University of Maine	<b>Michael S. Thibodeau</b> .....University of Connecticut
<b>Wilbert H.M. Heijne</b> .....TNO Nutrition and Food Research	<b>Joshua J. Tobias</b> .....University of Kentucky
<b>Zhe Jia</b> .....University of Texas at Austin	<b>Miyun M. Tsai-Turton</b> .....University of California Irvine
<b>Nathan H. Johnson</b> .....Mississippi State University	<b>Anu Vaidyanathan</b> .....Northeastern University
<b>Raju Naveen Kumar Kacham</b> .....Oklahoma State University	<b>Joanne Wan</b> .....Queen's University
<b>Jeffrey A. Kamykowski</b> .....Mississippi State University	<b>Laura J. Webb</b> .....Virginia Commonwealth University
<b>Sanghyun Kim</b> .....University of Georgia	<b>Ryan L. Williams</b> .....University of California
<b>Dae Joon Kim</b> .....Pennsylvania State University	<b>Daniel T. Wilson</b> .....Rutgers University
<b>Masashi Kitazawa</b> .....Iowa State University	<b>Andrea W. Wong</b> .....University of Toronto
<b>Lioudmila A.Komarnisky</b> .....University of Alberta	<b>Jennifer S. Yauck</b> .....Medical College of Wisconsin
<b>Timothy J. Kropp</b> .....University of Michigan	<b>Junguo Zhou</b> .....University of Rochester
<b>Ning Li</b> .....University of Kansas Medical Center	
<b>Jian Li</b> .....University of Louisville	

## Colgate-Palmolive/SOT Award for Student Research Training in Alternative Methods

**Sachin Devi**

University of Louisiana  
at Monroe

**Pallavi Limaye**

University of Louisiana  
at Monroe

**Midhum Korrapati**

University of Louisiana  
at Monroe