**PHILIP STEWART LOW**

Birthdate: August 8, 1947 Birthplace: Ames, Iowa
Married: Joan B. Foord

Education

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| B.S. Brigham Young University (cum laude) | 1971 |
| Ph.D. University of California, San Diego | 1975 |

Professional Experience

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| Postdoctoral, Univ. of Massachusetts (Prof. John F. Brandts) | 1975 |
| Assistant Professor, Purdue University | 1976 |
| Associate Professor, Purdue University | 1982 |
| Professor, Purdue University | 1986 - present |
| Head, Biochemistry Division of the Department of Chemistry | 1988 - 1997 |
| Joseph F. Foster Distinguished Professor of Chemistry | 1995 – 2001 |
| Adjunct Professor, Pohang University of Science and Technology, Korea | (1999- ) |
| R.C. Corley Distinguished Professor of Chemistry | 2001-present |
| Director Purdue University Center for Drug Discovery | 2012-2017 |
| Presidential Scholar for Drug Discovery | 2017-present |
| Full Affiliate Member, Houston Methodist Research Institute | 2014-present |
| Courtesy Appointment in the Department of Medicinal Chemistry and Molecular Pharmacology, Purdue University | 2017-present |

Professional Societies (past and present)
American Association for Cancer Research
American Chemical Society
American Society for Biochemistry and Molecular Biology
American Society of Hematology
Controlled Release Society
Red Cell Club
Sigma Xi
American Association for the Advancement of Science
The Folate Receptor Society
Member of the Advisory Board - International Society of Image Guided Surgery

Honors
International Union Against Cancer Fellow (1987)
Indiana Lions Club Cancer Research Award (1991)
Herbert Newby McCoy Award (1993) (The university's award for outstanding research)
Sigma Xi Research Award, Purdue Chapter (1997)
Elected Fellow of the American Association for the Advancement of Science (1998)
Chair, Gordon Research Conference on Red Cells (1999)
National Institutes of Health MERIT Award (1999-2009)

Jacobs-Parpart-Ponder Lecture, Biophysical Society, Red Cell Club (2000)
World of Difference Award, Indiana Health Industry Forum (2000)
Outstanding Commercialization Award for Purdue University Faculty (2006)
Co-Organizer, Membranes and Cancer Biology Symposium (May 2010)
Co-Chair, LDS Life Science Symposium, Park City, UT (July 2010)
Chair, Gordon Research Conference (Drug Carriers in Medicine and Biology) (August 15-20, 2010)
Organizer, Third International Symposium on Folate Receptors and Transporters (October 12 – 16, 2010)
President, Folate Receptor Society (2011-present)
BYU Distinguished Alumnus Award (2013)
Watanabe Life Sciences Champion of the Year Award (2013)
Morrill Award (2014)
American Chemical Society Award for Cancer Research (George and Christine Sosnovsky Award) (2015)
American Association for Cancer Research (AACR) Award for Outstanding Achievement in Chemistry in Cancer Research (2015)
Elected National Academy of Inventors (2015)
Roland T. Lakey Award (2015)
Mathias P. Mertes Award (2015)
Co-Chair AACR 2017 National Meeting Program Committee
Peter Speiser Award (2018)
Primary inventor on more than 70 U.S. patents/patents pending

**PUBLICATIONS (since 1973)**

1. Temperature Adaptation of Enzymes: Roles of the Free Energy, the Enthalpy, and the Entropy of Activation. Low PS, Bada JL, Somero GN. *Proc. Nat. Acad. Sci*. 70:430-2 (1973).
2. Bile Pigments in the Blood Serum of Fish from the Family Cottidae. Low PS, Bada JL. *Comp. Biochem. Physiol.* 47A:411-18 (1974).
3. Temperature Adaptation of Enzymes: A Proposed Molecular Basis for the Different Catalytic Efficiencies of Enzymes from Ectotherms and Endotherms. Low PS, Somero GN. *Comp. Biochem. Physiol.* 49B:307-12 (1974).
4. Activation Volumes in Enzymic Catalysis: Their Sources and Modification by Low Molecular Weight Solutes. Low PS, Somero GN. *Proc. Natl. Acad. Sci. USA* 72:3014-18 (1975).
5. Protein Hydration Changes During Catalysis: A New Mechanism to Account for Enzymic Rate-Enhancement and Ion Activation/Inhibition of Enzymes. Low PS, Somero GN. *Proc. Natl. Acad. Sci. USA* 72:3305-9 (1975).
6. Pressure Effects on Enzyme Structure and Function *in vitro* and *in vivo.* Low PS, Somero GN. *Comp. Biochem. Physiol.* 52B:67-74 (l975).
7. Temperature: A "Shaping Force" in Enzyme Evolution. Somero GN, Low PS. *Biochemical Society Symposium* 41:33-42 (1976).
8. Adaptation of Muscle Pyruvate Kinases to Environmental Temperatures and Pressures. Low PS, Somero GN. *J. Exp. Zool.* 198:1-12 (1976).
9. Eurytolerant Proteins: Mechanisms for Extending the Environmental Tolerance Range of Enzyme-Ligand Interactions. Somero GN, Low PS. *American Naturalist* 111:527-38 (1977).
10. Identification of a Structural Region Involved in Anion Transport. Snow JW, Brandts JF, Low PS. *Fed. Proc.* 36:896 (l977).
11. Neutral Salt Effects on the Velocity and Activation Volume of the Lactate Dehydrogenase Reaction: Evidence for Enzyme Hydration Changes During Catalysis. Somero GN, Newbauer M, Low PS. *Arch. Biochem.* 181:438-46 (1977).
12. Enzyme Hydration May Explain Catalytic Efficiency Differences Among Lactate Dehydrogenase Homologues. Somero GN, Low PS. *Nature* 266:276-8 (1977).
13. Protein Water Binding Ability Correlates with Cellular Osmolarity. Low PS, Hoffman K, Swezey R, Somero GN. *Experientia* 34:314-5 (1978).
14. The Interaction of Adenine Nucleotides with the Red Cell Membrane: A Calorimetric Study. Low PS, Brandts JF. *Arch. Biochem. Biophys.* 190:640-6 (1978).
15. Calcium-Anesthetic Interactions in the Erythrocyte Membrane. Low PS, Roger JA III. *J. Supramol. Structures, Suppl.* 2:211 (1978).
16. Specific Cation Modulation of Anion Transport Across the Human Erythrocyte Membrane. Low PS. *Biochem. Biophys. Acta* 514:264-73 (1978).
17. Protein Hydration Changes During Catalysis: An Important Contribution to the Properties of Enzyme Catalyzed Reactions. Low PS. *Symp. Biol. Hungarica* 21:217-47 (1978).
18. The Effects of Anion Transport Inhibitors on Structural Transitions in Erythrocyte Membranes. Snow JW, Brandts JF, Low PS. *Biochem. Biophys. Acta* 512:579-91 (1978).
19. Calcium Modification of the Anion Transport Mechanism in Red Blood Cells. Gunn RB, Frohlich O, Macintrye JD, Low PS. *Biophys. J.* 25:106a (1979).

20. Specific Fluorescence Labeling of Erythrocyte Membrane Proteins. Abraham G, Low PS. *Fed. Proc.* 38:357 (1979).
21. Calcium Displacement by Local Anestetics: Dependence on pH and Anesthetic Charge. Low PS, Lloyd DH, Stein TM, Rogers JA III. *J. Biol. Chem.* 254:4119-25 (1979).
22. Colvalent Labeling of Specific Membrane Carbohydrate Residues with Fluorescent Probes. Abraham G, Low PS. *Biochem. Biophys. Acta* 597:285-91 (1980).
23. Response of Isolated Plant Membranes to Auxins: Calcium Release. Buckhout TJ, Young KA, Morre DJ, Low PS. *Botanical Gaz.* 141:418-21 (1980).
24. Differential Scanning Calorimetry of Chloroplast Membranes: Identification and Partial Characterization of the A Transition. Whitmarsh CJ, Cramer WA, Low PS. *Fed. Proc.* 39:1023 (1980).
25. Differential Scanning Calorimetry of Chloroplast Membranes. Cramer WA, Low PS, Selman BR, Whitmarsh J, Widger W. *Proc. 5th Int. Conf. Photosynth.*, (ed. G. Akoyunoglou), pp. 121-129(1981).
26. Differential Scanning Calorimetry of Chloroplast Membranes: Identification of an Endothermic Transition Associated with the Water-Splitting Complex of Photosystem II. Cramer WA, Whitmarsh J, Low PS. *Biochemistry* 20:157-62 (1981).
27. The Effect of Anesthetic Charge on Anesthetic-Phospholipid Interactions. Davio SR, Low PS. *Biochim. Biophys. Acta* 644:157-64, (1981).
28. Lateral Diffusion of Glycophorin Reconstituted into Phospholipid Multibilayers. Wu ES, Low PS, Webb WW. *Biophys. J.* 33:109a (1981).
29. Effect of pH on the Cytoplasmic Domain of the Human Erythrocyte Membrane Protein, Band 3. Low PS, Appell KC. *Fed. Proc.* 40:1192 (1981).
30. *In vitro* Promotion by Auxins of Divalent Ion Release From Soybean Membranes. Buckhout TJ, Young KA, Low PS, Morre DJ. *J. Plant Physiol.* 68:512-5 (1981).
31. Partial Structural Characterization of the Cytoplasmic Domain of the Erythrocyte Membrane Protein, Band 3. Appell KC, Low PS. *J. Biol. Chem.* 256:11104-11 (1981).
32. Evaluation of the Structural Interdependence of the Membrane-Spanning and Cytoplasmic Domains of Band 3. Appell KC, Low PS. *Biochemistry* 21:2151-7, (1982).
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34. Characterization of the Calorimetric C Transition of the Human Erythrocyte Membrane. Davio SR, Low PS. *Biochemistry* 21:3585-93 (1982).
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36. Differential Scanning Calorimetry of Milk Fat Globule Membranes. Appell KC, Low PS. *Biochim. Biophys. Acta.* 690:243-50 (1982).
37. Differential Scanning Calorimetry of Milk Fat Globule Membranes. Burnier RC, Low PS. *Fed. Proc.* 42:1773 (1983).
38. Search for an Endotherm in Chloroplast Lamellar Membranes Associated with Chilling-Inhibition of Photosynthesis. Low PS, Cramer WA, Ort D, Whitmarsh J. *Arch. Biochem. Biophys*. 231:336-44 (1984).
39. Distinct Tyrosine Protein Kinases are Expressed by T and B Lymphocytes. Harrison ML, Low PS, Geahlen RL. *Fed. Proc.* 43:1468 (1984).

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52. Elicitor Stimulation of the Defense Response in Cultured Plant Cells Monitored by Fluorescent Dyes. Low PS, Heinstein PF. *Arch. Biochem. Biophys.* 249:472-9 (1986).
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56. Signal Transduction Across Plasma Membranes of Cultured Cells. Low PS, Heinstein PF. *J. Cell. Biochem.* 10B:29 (1986).
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58. Tyrosine Phosphorylation of Band 3 Inhibits Peripheral Protein Binding. Low PS, Allen DP, Zioncheck TF, Chari P, Willardson BM, Geahlen RL, Harrison ML. *J. Biol. Chem.* 262:4592-6 (1987).
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67. Elicitor-Induced pH Changes in Cultured Soybean Cells. Apostol I, Low PS, Heinstein PF. *J. Cell. Biochem.* 12C:260 (1988).
68. Interaction of Native and Denatured Hemoglobins with Band 3: Consequences for Erythrocyte Structure and Function. Low PS. *Red Blood Cell Membranes*, (eds. P. Agre and P. Parker) Marcel Dekker, Inc., New York, pp. 237-260 (1989).
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80. Extracellular Control of Erythrocyte Metabolism Mediated by a Cytoplasmic Tyrosine Kinase. Low PS, Geahlen RL, Mehler E, Harrison ML. *Biomed. Biochim. Acta* 49:135-40 (1990).
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88. Role of Hemoglobin Denaturation and Band 3 Clustering in Initiating Red Cell Removal. Low PS. "Red Cell Aging" (ed. M. Magnani), Plenum Press: New York, *Adv. Exp. Med. Biol.* 307:173-183 (1991).
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92. Characterization of Parameters Influencing Receptor-Mediated Endocytosis in Cultured Soybean Cells. Horn MA, Heinstein PF, Low PS. *Plant Physiol.* 98:673-9 (1992).
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420. Regulation of erythrocyte Na+/K+/2Cl- cotransport by an oxygen-switched kinase cascade. Zheng S, Krump NA, McKenna MM, Li YH, Hannemann A, Garrett LJ, Gibson JS, Bodine DM, Low PS. *J Biol Chem*. RA118.006393 (2018)
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424. Bone-Fracture-Targeted Dasatinib-Oligoaspartic Acid Conjugate Potently Accelerates Fracture Repair. Wang M, Park S, Nam Y, Nielsen J, Low SA, Srinivasarao M, Low PS. *Bioconjug Chem* 29:3800-3809 (2018)
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428. Targeting of a Photosensitizer to the Mitochondrion Enhances the Potency of Photodynamic Therapy. Mahalingam, S, Ordaz, J, Low PS. *ACS Omega* 3:6066-6074 (2018)
429. Intraoperative Ureter Visualization Using a Novel Near-Infrared Fluorescent Dye. Mahalingam SM, Dip F, Castillo M, Roy M, Wexner SD, Rosenthal RJ, Low PS. *Mol Pharm* 15:3442-3447 (2018)
430. Aluminum Fluoride-18 Labeled Folate Enables in Vivo Detection of Atherosclerotic Plaque Inflammation by Positron Emission Tomography. Silvola JMU, Li XG, Virta J, Marjamäki P, Liljenbäck H, Hytönen JP, Tarkia M, Saunavaara V, Hurme S, Palani S, Hakovirta H, Ylä-Herttuala S, Saukko P, Chen Q, Low PS, Knuuti J, Saraste A, Roivainen A. *Sci Rep* 8:9720 (2018)
431. Prophylactic and therapeutic activity of alkaline phosphatase in arthritic rats: single-agent effects of alkaline phosphatase and synergistic effects in combination with methotrexate. Chandrupatla DMSH, Molthoff CFM, Ritsema WIGR, Vos R, Elshof E, Matsuyama T, Low PS, Musters RJP, Hammond A, Windhorst AD, Lammertsma AA, van der Laken CJ, Brands R, Jansen G. *Transl Res* 199:24-38 (2018)

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433. Development of a Small Molecule Tubulysin B Conjugate for Treatment of Carbonic Anhydrase IX Receptor Expressing Cancers. Marks IS, Gardeen SS, Kurdziel SJ, Nicolaou ST, Woods JE, Kularatne SA, Low PS. *Mol Pharm* 15:2289-2296 (2018)
434. A Brief Report: Localization of Pulmonary Ground-Glass Opacities with Folate Receptor-Targeted Intraoperative Molecular Imaging. Predina JD, Newton A, Corbett C, Xia L, Frenzel Sulyok L, Shin M, Deshpande C, Litzky L, Barbosa E, Low PS, Kucharczuk JC, Singhal S. *J Thorac Oncol* 13:1028-1036 (2018)
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436. Use of a Single CAR T Cell and Several Bispecific Adapters Facilitates Eradication of Multiple Antigenically Different Solid Tumors. Lee YG, Marks I, Srinivasarao M, Kanduluru AK, Mahalingam SM, Liu X, Chu H, Low PS. *Cancer Res.* 79(2):387-396 (2019)
437. A targeted tubulysin B hydrazide conjugate for the treatment of LHRH receptor-positive cancers. Roy J, Kaake M, Low PS. *Oncotarget* 10(2):152-160. (2019)

In Press/Submitted

438. Competition between deoxyhemoglobin and WNK1 for binding to band 3 mediates O2-dependent regulation of erythrocyte Na+-K+-2Cl- cotransport. Zheng S, Li Y, Hannemann A, Gibson JS, Bodine DM, and Low PS. Submitted (2018)
439. Regulation of CAR T Cell-Mediated Cytokine Storms with Low Molecular Weight Adapters. Lee YG, Chu H, Lu Y, Leamon CP, Srinivasarao M and Low PS. Submitted (2018)
440. A Phase II, Multicenter, Open-Label Study to Investigate the Safety and Efficacy of OTL38 Injection (OTL38) for Intra-operative Imaging of Folate Receptor-alpha Positive Ovarian Cancer. Randall LM, Wenham RM, Low PS, Dowdy SC, and Tanyi JL. Submitted (2018)
441. Development of a Prostate-Specific Membrane Antigen Targeted Contrast Agent to Identify Residual Prostate Cancer During Prostatectomy. Predina J, Xia L, Newton A, Corbett C, Baldassari M, Osharovich S, Shin M, Sufyok LF, Deshpande C, Low PS, Guzzo T, and Singhal S. Submitted (2018)
442. Evaluation of a Neurokinin-1 Receptor Targeted 99mTechnetium Conjugate for Neuroendocrine Cancer Imaging. Kanduluru AK, Srinivasarao M, Wayua C, Low PS. Submitted. (2019)
443. Evidence for three populations of the glucose transporter in the human erythrocyte membrane" Kodippili G, Putt K, Low PS. Accepted (2019)
444. Folate receptor-beta expression as a diagnostic target in human & rodent nonalcoholic steatohepatitis. Lake AD, Hardwick RN, Leamon CP, Low PS, Cherrington NJ. In Press (2019)
445. Preclinical Evaluation of Bispecific Adaptor Molecule Controlled Folate Receptor CAR-T Cell Therapy with Special Focus on Pediatric Malignancies. Lu J, Chu H, Wheeler LW,

Nelson M, Westrick E, Matthaei JF, Cardle II, Johnson A, Gustafson J, Parker N, Vetzel1 M, Xu L, Wang E, Jensen M, Klein P, Low PS and Leamon CP. In Press (2019)

446. Folate receptor-targeted positron emission tomography of experimental autoimmune encephalomyelitis in rats. Elo P, Li XG, Liljenbäck H, Helin S, Teuho J, Koskensalo K, Saunavaara J, Marjamäki P, Virta J, Chen Q, Low PS, Knuuti J, Jalkanen S, Airas L, Roivainen A. Submitted (2019)
447. Clinical impact of the two ART resistance markers, K13 gene mutations and DPC3 in Vietnam. Tsamesidis I, Vuattux-Reybier K, Marchetti G, Carmina Pau M, Fozza C, Chien HD, Nepveu F, Low PS, Turrini FM and Pantaleo A. Submitted (2019)
448. Dysfunctional Stem and Progenitor Cells Impair Fracture Healing with Age. Wagner DR, Karnik S, Gunderson ZJ, Nielsen JJ, Fennimore A, Promer HJ, Lowery JW, Loghmani MT, Low PS, O McKinley T, Kacena MA, Clauss M, Li J. Submitted (2019)
449. Folate Receptor Beta Designates a Subset of Immunosuppressive Tumor-Associated Myeloid Cells that Can Be Reprogrammed with Folate-Targeted Drugs. Cresswell G and Wang B, Kischuk E, Broman M, Alfar RAT, Vickman R, Dimitrov DS, Kularatne S, Crist S, Elzey B, Ratliff TL and Low PS. Submitted (2019)
450. Targeting Erythrocyte's Band 3 Tyrosine Phosphorylation for Treatment of Sickle Cell Disease.
451. Identification of tyrosine kinase classes that inhibit P. falciparum parasitemia. Kesely K, Noomuna P, Hipskind P, Vieth M, Haldar K, Pantaleo A, Turrini F, and Low PS. Submitted (2019)
452. Targeted approach for imaging and therapy in Idiopathic Pulmonary Fibrosis. Hettiarachchi SU, Li YH, Zhang FH, Puchulu-Campanella E, Roy J, Lindeman S, Srinivasarao M, Tsoyi K, Rosas IO, Low PS. Submitted (2019)

**INVITED LECTURES (Please note that in recent years many speaking invitations have been declined due to lack of time)**

1. "Molecular Mechanisms of Enzyme Adaptation to Temperature." Department of Physiology and Biophysics, University of Illinois, Urbana, IL, January 1975. Invited.
2. "Molecular Mechanisms of Enzyme Adaptation to Temperature." Department of Zoology, University of Iowa, Iowa City, IA, January 1975. Invited.
3. "Molecular Mechanisms of Enzyme Adaptation to Temperature." University of Texas Marine Station at Port Aransas, TX, March, 1975. Invited.
4. "Molecular Mechanisms of Enzyme Adaptation to Temperature." Department of Zoology, University of Texas at Austin, TX, March 1975. Invited.
5. "Molecular Mechanisms of Enzyme Adaptation to Temperature." Department of Biological Sciences, University of California at Santa Barbara, CA, April 1975. Invited.
6. "Molecular Mechanisms of Enzyme Adaptation to Temperature." Interdepartmental Biochemistry at Purdue University, W. Lafayette, IN, March 31, 1976. Invited.
7. "Molecular Mechanisms of Enzyme Adaptation to Temperature." Department of Biological Sciences, State University of New York at Buffalo, NY, April 8, 1976. Invited.
8. "Identification of Erythrocyte Membrane Structures with Membrane-mediated Functions - A Calorimetric Approach." Interdepartmental Biochemistry at Purdue University, W. Lafayette, IN, February 21, 1977. Invited.
9. "Identification of Erythrocyte Membrane Structures Involved in Anion Transport and Control of Cell Shape." Organic Chemistry Division, Chemistry Department, Purdue University, W. Lafayette, IN, March 3, 1977. Invited.
10. "Identification of a Structural Region Involved in Anion Transport." Federation of American Societies for Experimental Biology, Chicago, IL, April 7, 1977. Invited.
11. "Calcium-Anesthetic Interactions in the Erythrocyte Membrane." ICN-UCLA Symposia, Keystone, CO, March 8, 1978. Invited.
12. "A Calorimetric Study of Structure-Function Relationships in the Red Cell Membrane Structure." Indiana University Medical School, Indianapolis, IN, March 24, 1978. Invited.
13. "Protein Hydration Changes During Catalysis: An Important Contribution to the Properties of Enzyme Catalyzed Reactions." Symposium sponsored by the Hungarian Academy of Sciences and the Medical University at Debrecen. Debrecen, Hungary, July 11, 1978. Invited.
14. "A Calorimetric Investigation of Anion Transport Structures of the Red Cell Membrane". The Research Hospital for Sick Children, Ontario, Canada, July 17, 1978. Invited.
15. "The Structure of the Red Blood Cell Membrane: A Calorimetric Study." Cell Biology Interdepartmental Seminar, University of Illinois, Urbana-Champaign, IL, December 18, 1978. Invited.
16. "Physical Studies of the Structure of the Red Blood Cell Membrane." Notre Dame University, Department of Biology, Notre Dame, IN, April 10, 1979. Invited.
17. "The Anion Transport Structure of the Human Erythrocyte Membrane." University of California, Department of Biology, October 31, 1979. Invited.

18. "Calorimetric Studies of the Human Erythrocyte and Spinach Chloroplast Membranes." Scripps Institution of Oceanography, Department of Marine Biology, San Diego, CA, November 2, 1979. Invited.
19. "Structural Studies of the Human Erythrocyte Membrane." Beloit College, Department of Chemistry, Beloit, WI, February 8, 1980. Invited.
20. "Structural Studies of the Human Erythrocyte Membrane." University of Iowa Medical School, Iowa City, IA, February 13, 1980. Invited.
21. "Structural Studies of the Human Erythrocyte Membrane." University of Texas at San Antonio, Department Allied Biological Sciences, San Antonio, TX, April 15, 1980. Invited.
22. "Are Band 3 and Glycophorin Associated in the Human Erythrocyte Membrane?" Frontier in Biomembrane Research Conference, Detroit, MI, May 15, 1980. Presented by postdoctoral associate, Dr. George Abraham.
23. "Differential Scanning Calorimetry of Chloroplast Membranes." ASBC Meeting, New Orleans, LA, June 3, 1980.
24. "The Structure of the Human Red Blood Cell Membrane." University of Wisconsin, Department of Chemistry, Parkside, WI, November 14, 1980. Invited.
25. "The Structure of the Red Blood Cell Membrane." Augustana College, Moline, IL, January 27, 1981. Invited.
26. "The Structure of the Red Blood Cell Membrane." Monmouth College, Galesburg, IL, January 28, 1981. Invited.
27. "The Structure and Response to Modulators of the Cytoplasmic Domain of Band 3." 3rd Biennial Thrasymachan Conference, Memphis, TN, March 27, 1981. Invited.
28. "The Cytoplasmic Domain of Band 3:Structure and Response to Modulators of Red Cell Function." Red Cell Club Symposium, at FASEB, Atlanta, GA, April 12, 1981. Invited.
29. "Effect of pH on the Cytoplasmic Domain of the Human Erythrocyte Membrane Protein, Band 3." American Society of Biological Chemists, St. Louis, MO. June 3, 1981.
30. "Anesthetics and Membranes." ACS Affiliate, Wittenberg Univ., Dept. of Chemistry, Springfield, OH, October 14, 1981. Invited.
31. "Biophysical Studies of the Red Blood Cell Membrane." Research and Development Center, Kraft, Inc., Glenview, IL, October 27, 1981. Invited.
32. "The Structure of the Anion Transport Protein of the Human Erythrocyte Membrane." PUB Seminar, Purdue Univ., W. Lafayette, IN, November 23, 1981. Invited.
33. "Differential Scanning Calorimetry: A Powerful Tool for Research of Biological Membranes." Monsanto Corp., St. Louis, MO, October 22, 1982. Invited.
34. "DSC: A Powerful Tool for Research of Biological Membranes." Plant Sciences Division, Monsanto Co., November 12, 1982. Invited.
35. "Differential Scanning Calorimetry of the Milk Fat Globule Membrane." Protein Chemistry Division, Kraft, Inc., December 14, 1982. Invited.
36. "The Structure of the Red Cell Membrane." Department of Chemistry, Kent State University, Kent, OH, March 3, 1983. Invited.
37. "The Structure of the Human Erythrocyte Membrane." Department of Biological Chemistry, Wright State University Medical School, Dayton, OH, May 13, 1983. Invited.
38. "Differential Scanning Calorimetry of Erythrocyte Membranes." International Symposium on the Thermodynamics of Proteins and Biological Membranes, Granada, Spain, May 23-27, 1983. Invited.

39. "Differential Scanning Calorimetry of Milk Fat Globule Membranes." ASBC Meeting, San Francisco, CA, June 6, 1983.
40. "Association of Hemoglobin with Erythrocyte Band 3." ASBC meeting, San Francisco, CA, June 9, 1983.
41. "Possible Mechanism of Regulation of Membrane-Cytoskeletal Interactions in Erythrocytes." International Symposium on the Contractile Proteins, Sasari, Italy, October 1-5, 1983. Invited.
42. "The Interaction of Erythrocyte Band 3 with Peripheral Proteins." University of Minnesota Medical School, November 17, 1983. Invited.
43. "New Observations on the Structures of the Milk Fat Globule and Red Cell Membranes." Kraft, Inc., Chicago, IL, January 24, 1984. Invited.
44. "Anesthetics and Membranes." Illinois Wesleyan University, Dept. of Chemistry, Bloomington, IL, February 7, 1984. Invited.
45. "Unraveling the Structures and Functions of Erythrocyte Membrane Band 3." Virginia Commonwealth University Medical School, Richmond, VA, March 12, 1984. Invited.
46. "Low Temperature Endotherms in Chloroplast Membranes." ICN-UCLA Symposium on Cellular and Molecular Biology of Plant Stress, Keystone, CO, April 16-20, 1984.
47. "The Structure and Many Functions of the Erythrocyte Membrane Protein, Band 3." Washington State University, Department of Biochemistry and Biophysics, Pullman, WA, May 3, 1984. Invited.
48. "Role of Erythrocyte Band 3 in Regulation of Membrane - Peripheral Protein Interactions." Gordon Research Conference on Biopolymers, Holderness School, Plymouth, NH, June 24-28, 1984. Invited.
49. "Physico-chemical Basis of Protein-Solute-Water Interactions." First Intern. Congress of Comp. Physiol. and Biochem., Liege, Netherlands, Aug.27-31, 1984. Invited.
50. "The Structures and Functions of Erythrocyte and Nonerythroid Band 3." Department of Hematology and Oncology, Indiana University School of Medicine, Indianapolis, IN, November 7, 1984. Invited.
51. "The Structures and Functions of Erythrocyte and Nonerythroid Band 3." Argonne National Laboratories, Chicago, IL, December 6, 1984. Invited.
52. "The Structures and Functions of Erythrocyte and Nonerythroid Band 3." Department of Chemistry, Northern Illinois University, De Kalb, IL, December 7, 1984. Invited.
53. "Identification of Herbicide Binding Sites in Chloroplast Membranes" and "Elicitation of Plant Defense Mechanisms." NSF sponsored University - Industry Cooperative Research Discussion, Atlanta, GA, January 21, 1985. Invited.
54. "The Structures and Functions of Erythrocyte and Nonerythroic Band 3." Department of Chemistry, Brigham Young University, Provo, UT, January 22, 1985. Invited.
55. "The Role of Band 3 in Red Cell Aging." Biophysical Society Meetings, Red Cell Club Symposium, Baltimore, MD, February 24-28, 1985. Invited.
56. "Band 3 is Found at Cytoskeleton - Membrane Junctions of Nucleated Cells and Binds Vinculin." UCLA Symposium, Park City, UT, March 11, 1985.
57. "The Structures and Functions of Erythrocyte and Nonerythroid Band 3." Department of Chemistry, Southern Illinois University, April 19, 1985. Invited.
58. "Structure and Function of Erythrocyte Band 3." Department of Biochemistry, University of Chicago, Chicago, IL, May 6, 1985. Invited.

59. "Molecular Mechanisms of Signal Transduction in Cultured Plant Cells." Monsanto Co., July 29-31, 1985. Invited.
60. "Protecting Tissues Against Hypoxia." Lecture at International Union Biochem. Satellite Symp., Leiden, The Netherlands, August 22-24, 1985. Invited.
61. "Band 3 Interacts with Vinculin." American Society for Cell Biology, 25th Annual Meeting of Cell Biologist, Atlanta, GA, November 18, 1985.
62. "Mechanism on Red Blood Cell Aging." Indiana State University, Terre Haute, IN, December 2, 1985. Invited.
63. "Signal Transduction across Plasma Membranes of Cultured Cells." 1986 UCLA Symposia on Molecular Biology of Plant Growth Control, Lake Tahoe, CA, February 21-28, 1986.
64. "Signal Transduction across Plant Plasma Membranes." Shell Development Co. Modesto, CA, April 1986. Invited.
65. "Methods of Animal and Plant Cell Membrane Research." 9 Universities and Institutes in China, May 7 - June 7, 1986. Sponsored by the Bureau of Science and Technology, Ministry of Agriculture (Invited).
    a) National Academy of Biophysics
    b) Beijing Agricultural University
    c) Northwest Agricultural University
    d) Southwest Agricultural University
    e) Sichuan Academy of Agricultural Sciences
    f) Wuhan Agricultural University
    g) Hubei Academy of Agricultural Sciences
    h) Nanjing Agricultural University
    i) Zhejiang Agricultural University
66. "On the Amion Carrier Protein of Red Cells." Biozentrum der Universitat, Basel, Switzerland, March 10, l987. Invited.
67. "Regulation of Membrane - Peripheral Protein Interactions in Erythrocytes." Biozentrum der Universitat Basel, Switzerland, March 17, 1987. Invited.
68. "Studies of Band 3 from Erythrocytes and Non-erythroid Cells." Max-Planck-Institut fhr Biophysik, Frankfurt, W. Germany, April 30, 1987. Invited.
69. "Regulation of Membrane - Protein Interactions in Erythrocytes." Department of Biochemistry, ETH Zurich, Switzerland, May 12, 1987. Invited.
70. "Structure, Function, and Peripheral Protein Interactions of the Major Erythrocyte Membrane Protein, Band 3." Institut de Biologie Physico-Chimique, C.N.R.S., Paris, France, May 19, 1987. Invited.
71. "Regulation of Peripheral Protein Binding to Human Erythrocyte Band 3." Dept. of Physiology, Rhein.-Westf. Techische Hochschule Aachen, W. Germany, May 26, 1987. Invited.
72. "The Role of Band 3-hemichrome Interactions in the Pathology of b-thalassemia, A disease of Red Blood Cells." Hadassah Medical School, Jerusalem, Israel, July, 1987. Invited.
73. "Red Cells." Gordon Conference, Plymouth, NH, August, 1987.
74. "The Role of Band 3 in Red Cell Aging." University of Turin, Turin, Italy, July 17, 1987. Invited.

75. "The Structure of the Red Cell Membrane." Hadassah Medical School, Jerusalem, Israel, July 25, 1987. Invited.
76. "Regulation of Membrane-Peripheral Protein Interactions in Erythrocytes." University of Florida School of Medicine, Gainesville, FL, November 12, 1987. Invited.
77. "Regulation of Band 3-Peripheral Protein Interactions in Erythrocytes." University of Alberta, Department of Biochemistry, Edmonton, Canada, December 21, 1987 (Invited).
78. "Signal Transduction Across Plant Plasma Membranes." Monsanto Co., St. Louis, MO, January 19, 1988. Invited.
79. "Regulation of Peripheral Protein Binding to Erythrocytes." Indiana Medical School Branch Campus in Gary, IN, January 22, 1988. Invited.
80. "Structure of the Human Red Blood Cell Membrane." University of Northern Kentucky, Highland Heights, KY, April 14, 1988. Invited.
81. "Signal Transduction During Elicitation." First International Workshop on Second Messengers and Phosphoinositides in Plants, West Lafayette, IN, April 14-16, 1988. Invited.
82. "Regulation of Protein Binding to the Erythrocyte Membrane." University of California, School of Medicine, San Francisco, CA, May 18, 1988. Invited.
83. "Young to Old: Transitions in Aging." Second International Congress of Comparative Physiology and Biochemistry, Baton Rouge, LA, August 1-5, 1988. Invited.
84. "Structure and Function of Erythrocyte Membrane Band 3." Max-Planck Inst. Symposium on Membrane Proteins, Frankfurt, W. Germany, September 27-29, 1988. Invited.
85. "Signal Transduction Pathways During Elicitation in Cultured Plant Cells." Friedrich Miescher Institute Seminar on Plant Signal Transduction, Basel, Switzerland, September 25, 1988-October 4, 1988. Invited.
86. "Effect of Hemoglobin Denaturation on Membrane Structure and IgG Binding: Role in Red Cell Aging." Seventh International Conference on Red Cell Metabolism and Function, Univ. of Michigan Medical Center, Ann Arbor, MI., October 25-27, 1988. Invited.
87. "Structure of the Red Blood Cell Membrane." Department of Chemistry, University of Michigan at Dearborn, MI, October 27, 1988. Invited.
88. "Consequences of Hemichrome Binding on Membrane Structure." American Society of Cell Biology Symposium on Cell Aging, University of California, San Francisco, CA, January 25, 1989. Invited.
89. "Regulation of Glycolysis and Membrane-Cytoskeleton Association by the Cytoplasmic Domain of Band 3." UCLA Symposia on Molecular and Cellular Biology of Normal and Abnormal Erythroid Membranes, Taos, NM, February 3-10, 1989. Invited.
90. "Structure and Function of the Cytoplasmic Domain of Band 3." First International Conference on Anion Transport Proteins, Fukuoka, Japan, May 1-5, 1989. Invited.
91. A series of seminars entitled: 1) "Structure of the Red Blood Cell Membrane", 2) "Mechanisms of Signal Transduction Across Plant Cell Membranes", 3) "Molecular Aspects of the Defense Response in Plants", 4) "Mechanism of Recognition and Destruction of Aged Cells" and 5) "Role of Tyrosine Kinases in Regulation of Cell Metabolism." Henan Tumor Research Institute, Institute of Biology, Zhengzhou, China, May 9-22, 1989. Invited.

92. "Band 3, Center of Erythrocyte Membrane Structure and Function." University of California, Riverside, CA, June 8, 1989. Invited.
93. "Extracellular Control of Erythrocyte Metabolism Mediated by a Cytoplasmic Tyrosine Kinase" and "Mechanism of Regulation of Erythrocyte Metabolism by Hormones and Tyrosine Kinases." XIIth International Symposium on Structure and Function of Erythroid Cells, Berlin, DDR, August 28-31, 1989. Invited.
94. "The Many Functions of Erythrocyte Membrane Band 3." Argonne National Laboratories, Chicago, IL, September 28, 1989. Invited.
95. "Mechanism of Red Cell Aging." University of British Columbia, Vancouver, B.C., October 2, 1989. Invited.
96. "Tyrosine Kinases and Regulation of Red Cell Metabolism." University of British Columbia, Vancouver, B.C., October 2, 198. Invited.
97. "Recent Exciting Research Results in Membrane Biochemistry." Showalter Trustees, W. Lafayette, IN, October 19, 1989. Invited.
98. "Red Blood Cell Models of Cellular Aging and Cancer." School of Veterinary Medicine, Purdue University, West Lafayette, IN, October 23, 1989. Invited.
99. "Nondestructive Delivery of DNA Plasmids and Proteins into Living Cells." Eli Lilly Co., Indianapolis, IN, December 5, 1989. Invited.
100. "Nondestructive Delivery of DNA Plasmids and Proteins into Living Cells." E. I. DuPont de Nemours and Co., Wilmington, DE, December 7, 1989. Invited.
101. "Nondestructive Delivery of DNA Plasmids and Proteins into Living Cells." Monsanto Co., St. Louis, MO, December 11, 1989. Invited.
102. "Delivery of Macromolecules into Living Cells." Dow Chemical, Midland, MI, February 7. 1990. Invited speaker.
103. "The Many Functions of Erythrocyte Membrane Band 3." University of Illinois at Chicago, IL, February 15, 1990. Invited.
104. "Delivery of Macromolecules into Living Cells." Eli Lilly Animal Sci. Div., Greenfield, IN, Feb. 22, 1990. Invited.
105. "Delivery of Macromolecules into Living Cells." E. I. DuPont de Nemours and Co., Wilmington, DE, March 13, 1990. Invited.
106. "Delivery of Macromolecules into Living Cells." Hoffmann-LaRoche, Nutley, NJ, March 14, 1990. Invited speakr.
107. "Signal Transduction during Elicitation of Cultured Cells." Department of Horticulture, Purdue University, W. Lafayette, IN, March 15, 1990. Invited.
108. "Nondestructive Delivery of DNA Macromolecules into Living Cells." Integrated DNA Technologies, Iowa City, IA, June 1, 1990. Invited.
109. "Signal Transduction by Elicitors in Cultured Soybean Cells." Gordon Conference at Proctor Academy on Plant Molecular Biology, June 20, 1990. Invited.
110. "A New Method for Delivering Macromolecules into Living Cells." University of Turin, Turin, Italy, July 13, 1990. Invited.
111. "Role of Hemoglobin Denaturation in Red Cell Aging." International Symposium on Red Cell Aging, Urbino, Italy, September 21, 1990. Invited.
112. "Regulation of Metabolism by a Cytoplasmic Tyrosine Kinase." University of Illinois College of Medicine, Chicago, IL, October 25, 1990. Invited.
113. "Vitamin-mediated Delivery of Macromolecules into Living Cells." 3M Pharmaceuticals, Minneapolis/St. Paul, MO, October 29, 1990. Invited.

114. "Tyrosine Kinase Regulation of Metabolism in Human Red Blood Cells." Red Cell Club Symposium, Wright State Univ., Dayton, OH, November 9, 1990. Invited.
115. "Regulation of Red Blood Cell Metabolism by a Tyrosine Kinase." Univ. of Missouri, Columbia, MO, November 28, 1990. Invited.
116. "Thermostability of Chloroplast Membrane Complexes." Gordon Conference on Temperature Stress in Plants, Casa Sirena Hotel, Oxnard, CA, January 14-18, 1991. Invited.
117. "The Many Functions of Band 3." Yale University Medical School, New Haven, CT, February 5, 1991. Invited.
118. "Functions of Erythrocyte Membrane Band 3." Univ. of Missouri Medical School, Kansas City, MO, March 7, 1991. Invited.
119. "Highlights of Red Cell Membrane Structure and Function." Indiana University, Dept. of Chemistry, Bloomington, IN, March 15, 1991. Invited.
120. "Oral Delivery of Macromolecules in Live Mice." Eli Lilly, Greenfield, IN, April 15, 1991. Invited.
121. "Signal Transduction across Plant Plasma Membranes." Indiana University, Dept. of Biology, Bloomington, IN, April 18, 1991. Invited.
122. "Receptor-Mediated Endocytosis in Plants." Max-Planck Institute, G`ttingen, Germany, May 3, 1991. Invited.
123. "Control of Glycolysis by Tyrosine Phosphorylation." International Symposium on Anion Transport Proteins, Munich, Germany, May 7, 1991. Invited.
124. "Signal Transduction during Elicitation." CNRS, Versailles, France, May 13, 1991 Invited speaker.
125. "Control of Glycolysis by Tyrosine Phosphorylation." UnitJ INSERM 299, H^pital de BicLtre, Le Kremlin-BicLtre, Paris, France, May 14, 1991. Invited.
126. "Vitamin Mediated Delivery of Molecules into Cells." Hoffman-LaRoche, Nutley, NJ, May 29, 1991. Invited.
127. "Control of Erythrocyte Glycolysis by Tyrosine Phosphorylation." Gordon Conference on Red Cells, Plymouth, NH, August 4-9, 1991. Invited.
128. "Control of Erythrocyte Glycolysis by Tyrosine Phosphorylation." Fourth International Meeting for The Use of Resealed Erythrocytes As Carriers and Bioreactors, Urbino, Italy, September 5-7, 1991. Invited.
129. "Nondestructive Delivery of Macromolecules into Living Cells." Biogen, Cambridge, MA, September 16-18, 1991. Invited.
130. "Highlights of Red Cell Membrane Structure and Function." Univ. of Kentucky Section of American Chemical Society, Lexington, KY, Oct. 3, 1991. Invited.
131. "Nondestructive Delivery of Macromolecules into Living Cells." Marion-Merrill-Dow, Indianapolis, IN, October 8, 1991. Invited.
132. "Nondestructive Delivery of Macromolecules into Living Cells." IUPUI, Indianapolis, IN, November 1, 1991. Invited.
133. "Regulation of Glycolysis by Tyrosine Phosphorylation." North Dakota School of Medicine, Grand Forks, ND, November 14, 1991. Invited.
134. "New Insights into the Structure of the Red Cell Membrane." North Dakota State University; Fargo, ND, November 15, 1991. Invited.
135. "Nondestructive Delivery of Macromolecules into Living Cells." Eli Lilly, Indianapolis, IN, December 3, 1991. Invited.

136. "Molecular Mechanism of Red Cell Aging." American Society of Hematology Meetings, Denver, CO, December 7, 1991. Invited.
137. "Receptor Mediated Endocytosis in Plant Cells." International Symposium on Vesicle Traffic & Protein Transport in Plants and Yeast, Gottingen, Germany, March 23-28, 1992. Invited.
138. "Signal Transduction Pathways during the Defense Response in Plants." Noble Foundation/Salk Institute, Ardmore, OK, April 2-5, 1992. Invited.
139. "Nondestructive Delivery of Macromolecules into Living Cells." Amgen, Thousand Oaks, CA, April 28, 1992. Invited.
140. "Mechanisms of Red Cell Aging." Miles Inc., Berkley, CA, April 29, 1992. Invited.
141. "Nondestructive Delivery of Macromolecules into Living Cells." Purdue University, Dept. of Animal Sciences, W. Lafayette, IN, May 1, 1992. Invited.
142. "Structure of the Human Erythrocyte Membrane." Wright State Medical School; Dayton, OH, May 7, 1992. Invited.
143. "Signal Transduction Across Plant Plasma Membranes." Max-Planck Inst fhr Zhchfungsforschung, K`ln, FRG, July 9, 1992. Invited.
144. "Nondestructive Delivery of Macromolecules Into Living Cells." Bayer Chemical Co., Leverkusen, FRG, July 10, 1992. Invited.
145. "Regulation of Membrane-skeletal Interactions by Band 3." European Association for Red Cell Research Meetings, Torino, Italy, July 12-16, 1992. Invited speaker.
146. "Nondestructive Delivery of Macromolecules into Living Cells." Boehringer-Mannheim, Indianapolis, IN, July 23, 1992. Invited.
147. "Signal Transduction During Elicitation of the Defense Response in Plants." Michigan State Univ., E. Lansing, MI, September 9-10, 1992. Invited.
148. "The Many Functions of Erythrocyte Membrane Band 3." Univ. of Illinois, Dept. of Biochemistry, Urbana, IL, September 18, 1992. Invited.
149. "Signal Transduction During Elicitation in Soybean." University of Texas at Austin, TX, November 13, 1992. Invited.
150. Attend and present a poster, Cell Biology Meeting, Denver, CO, November 15-19, 1992 Invited.
151. "Vitamin-Mediated Nondestructive Delivery of Macromolecules into Living Cells." KAST International Workshop on Molecular Recognition in Biomaterials, Tokyo, Japan, November 25-27, 1992. Invited.
152. "Beyond Anion Transport: The True Functions of Band 3." Univ. of Toronto, Toronto, Canada, December 8, 1992. Invited.
153. "Organization of Glycolytic Enzyme Complexes on Band 3." Gordon Conference, Enzyme Organization and Cell Function, Oxnard, CA, January 17-23, 1993. Invited.
154. "Nondestructive Delivery of Macromolecules into Living Cells." Vestar Inc., Los Angeles, CA, January 22, 1993. Invited.
155. "Nondestructive Delivery of Macromolecules into Living Cells." Industrial and Physical Pharmacy Dept., Purdue Univ., West Lafayette, IN, January 28, 1993. Invited.
156. "The Many Functions of Erythrocyte Membrane, Band 3." National Inst. Health, Bethesda, MD, February 19, 1993. Invited.
157. "Nondestructive Delivery of Macromolecules into Living Cells." Organic Division Seminar, Purdue Univ., West Lafayette, IN, March 4, 1993. Invited.

158. "Delivery of Macromolecules into Living Cells." Hoffmann-LaRoche, Nutley, NJ, March 12, 1993. Invited.
159. "Nondestructive Delivery of Macromolecules Across Epithelial Cell Layers." 3M Company, Minneapolis, MN, March 30, 1993. Invited.
160. "Role of Band 3 in Regulation of Red Cell Metabolism, Stability, Shape, and Lifespan." Los Alamos National Labs, Los Alamos, NM, April 21, 1993. Invited.
161. "Stimulation of H2O2 Production in Cultured Plant Cells." Cytonet Symposium, Breckenridge, CO, May 5-9, 1993. Invited.
162. "Role of Band 3 in Regulation of Red Cell Metabolism, Stability, Shape, and Lifespan." Lawrence Berkeley Labs, Berkeley, CA, May 10, 1993. Invited.
163. "Role of Band 3 in Regulation of Red Cell Metabolism, Stability, Shape, and Lifespan." University of Rochester, Rochester, NY, May 20, 1993. Invited.
164. "Nondestructive Delivery of Macromolecules into Living Cells." Glaxo Pharmaceuticals, Research Triangle, NC, June 7, 1993. Invited.
165. "Role of Band 3 in Regulation of Red Cell Metabolism." University of North Carolina School of Medicine, Chapel Hill, NC, June 25, 1993. Invited.
166. "Regulation of Red Cell Functions by Tyrosine Kinases." Red Cell Gordon Conference, Plymouth, NH, August 8-13, 1993. Invited.
167. "Nondestructive Delivery of Macromolecules into Living Cells." Monsanto Co., St. Louis, MO, September 1, 1993. Invited.
168. "Signal Transduction During Elicitation in Plants." International Union of Biochemistry and Molecular Biology Conference, Bari, Italy, September 29-October 3, 1993. Invited.
169. "Nondestructive Delivery of Macromolecules into Living Cells." McCoy Distinguished Lecture, Purdue Univ., West Lafayette, IN, October 14, 1993. Invited.
170. "Nondestructive Delivery of Macromolecules into Living Cells." Controlled Release Society Meeting, November 18, 1993. Invited.
171. "Many Functions of Erythrocyte Membrane Band 3." Wayne State Univ., Detroit, MI, November 23, 1993. Invited.
172. "Nondestructive Delivery of Macromolecules into Living Cells." Cibus Pharmaceutical Co., Redwood City, CA, January 5, 1994. Invited.
173. "Signal Transduction in Hematopoietic Cells." NIH Symposium, San Francisco, CA, February 12-16, 1994. Invited.
174. "Nondestructive Delivery of Macromolecules and Liposomes into Vitamin Receptor-Bearing Cells." 27th Annual Higuchi Research Seminar, Lake of Ozarks, MO, March 13-16, 1994. Invited.
175. "Redox-associated Regulation of Tyrosine Phosphorylation and Metabolism in Erythrocytes." 3rd International Symposium on Transplasma Membrane Redox, Cordoba, Spain, March 23-26, 1994. Invited.
176. "Nondestructive Delivery of Macromolecules into Living Cells." University of South Dakota, Vermillion, SD, April 11, 1994. Invited.
177. "Control of Red Cell Properties by Band 3." Blood Research Institute, Milwaukee, WI, May 9, 1994. Invited.
178. "Targeting Toxins to Tumor Cells." Interex Corp., Lawrence, KS, May 11-12, 1994 (Invited).
179. "Nondestructive Delivery of Macromolecules into Living Cells." Indianapolis Alumni Club, Indianapolis, IN, May 18, 1994. Invited.

180. "Recent Advances in Vitamin-Mediated Delivery Technology." Hoffmann-LaRoche Inc., Newark, NJ, June 5-6, 1994. Invited.
181. "Signal Transduction During the Oxidative Burst in Plants." 7th International Symposium on Molecular Plant-Microbe Interactions, Edinburgh, Scotland, June 27-July 1, 1994. Invited.
182. "Delivery of Macromolecules into Cancer Cells." Glaxo, Inc., Research Park, NC, July 4, 1994. Invited.
183. "The Many Functions of Erythrocyte Membrane Band 3." Los Alamos National Labs, Los Alamos, NM, August 16-19, 1994. Invited.
184. "Signal Transduction and Second Messengers of the Plant Defense Response." Symposium of Korean Botanical Society, Seoul, Korea, September 7-10, 1994. Invited.
185. "Signal Transduction and Second Messengers of the Plant Defense Response." The Pohang Institute of Science and Technology, Pohang, Korea, September 11, 1994. Invited.
186. "The Structure of the Human Erythrocyte Membrane." The Pohang Institute of Science and Technology", Pohang, Korea, September 12, 1994. Invited.
187. "Self-Defense by Plants: Induction and Signaling Pathways." The National Academy of Sciences Colloquium, Univ. of California, Irvine, CA, September 14-16, 1994. Invited.
188. "Characterization of a Novel SH2 Domain in Band 3." The 16th International Congress of Biochemistry and Molecular Biology, New Delhi, India, September 18-24, 1994. Invited.
189. "Membrane-Cytoskeleton Interactions in Erythrocytes." Forefronts in Nephrology Symposium, Tokyo, Japan, September 25-27, 1994. Invited.
190. "Role of Band 3 in Regulation of Erythrocyte Shape, Stability, Metabolism, and Senescence." Northwestern University, Evanston, IL, October 6, 1994. Invited.
191. "Nondestructive Targeting of Macromolecules to Tumor Cells." Genetic Therapy Inc., Gaithersburg, MD, October 19, 1994. Invited.
192. "Nondestructive Targeting of Molecules to Tumor Cells." Dept. of Pharmacology and Toxicology, Purdue University, West Lafayette, IN, November 9, 1994. Invited speaker.
193. "Use of Vitamins to Facilitate Protein Diffusion Across Epithelial Barriers." 3M Pharmaceuticals, Minneapolis, MN, December 12, 1994. Invited.
194. "Control of Red Cell Shape, Mechanical Stability, and Survival by Band 3 Protein." St. Elizabeth's Hospital, Boston, MA, December 14-15, 1994. Invited.
195. "Role of Band 3 in Red Cell Structure and Function." University of Texas, Galveston, TX, January 4, 1995. Invited.
196. "Nondestructive Targeting of Macromolecules into Tumor Cells." University of Texas, Galveston, TX, January 5, 1995. Invited.
197. "Nondestructive Targeting of Macromolecules into Tumor Cells." R-Gene Therapeutic, Houston, TX, January 6, 1995. Invited.
198. "Nondestructive Targeting of Macromolecules into Tumor Cells." B.Y.U., Chemistry Dept., Provo, UT, January 9, 1995. Invited.
199. "Targeting of Toxins, Antisense and Genes to Tumors." I.U. Medical School, Indianapolis, IN, January 25, 1995. Invited.
200. "Signal Transduction of the Oxidative Burst in Plants." Purdue University, Horticulture Dept., West Lafayette, IN, February 2, 1995. Invited.

201. "Targeting Toxins to Tumors." Indian Pharmaceutical Society, Ooty, India, February 20, 1995 Invited.
202. "Targeting Toxins to Tumors." K. M. College of Pharmacy, Madurai, India, February 22, 1995. Invited.
203. "Vitamin-Mediated Delivery of Proteins, Antisense Oligo's, and Genes into Living Cells." Association pour la Neuro Psycho Pharmacologie (Neurological Society Mtgs), Paris, France, February 27-March 1, 1995. Invited.
204. "Signal Transduction of the Oxidative Burst in Plants." Keystone Conference on Signal Transduction in Plants, Hilton Head, SC, April 3, 1995. Invited.
205. "Signal Transduction of the Oxidative Burst in Plants." Cold Spring Harbor Symposium on Molecular Biology of Disease Resistance Genes in Plants, Cold Spring Harbor Laboratory, NY, April 10, 1995. Invited.
206. "Targeting Toxins, Genes, and Low Molecular Weight Drugs to Tumors." University of Wisconsin, Milwaukee, WI, April 17, 1995. Invited.
207. "Role of Band 3 in Human Erythrocyte Aging." First International Conference on Red Cell Mediated Therapy, Boston, MA, August 5, 1995. Invited.
208. "Structure and Function of the Cytoplasmic Domain of Band 3." Gordon Research Conference on Red Cells, Plymouth, NH, August 6-11, 1995. Invited speaker.
209. "Folate-Mediated Drug Targeting to Cancer Cells." Inex Corp., Vancouver, BC, September 7-10, 1995. Invited.
210. "Signal Transduction of the Oxidative Burst." NSF Science and Technology Center (CEPRAP), Stanford University Sierra Camp, Lake Tahoe, September 29-October 1, 1995. Invited.
211. "Exploring the Many Functions of Erythrocyte Membrane Band 3." IU Medical School, Department of Nephrology, Indianapolis, IN, October 10, 1995. Invited.
212. "Folate-mediated Targeting of Chemotherapeutic Agents to Cancers." Kleiner, Perkins Inc., Menlo Park, CA, October 16, 1995. Invited.
213. "Folate-Mediated Targeting of Toxins, Antisense Oligonucleotides, and Genes to Tumors." Western Biotech Conference, San Diego, CA, October 17, 1995. Invited.
214. "Targeting of Liposomes to Tumor Cells." Liposome Company, Princeton, NJ, October 24, 1995. Invited.
215. "Targeting of Liposomes to Tumor Cells." EJF Inc., Lake Forest, IL, October 25, 1995 Invited.
216. "Vitamin-mediated Targeting of Therapeutic and Imaging Agents to Tumors." Advent International, Inc., October 31, 1995. Invited.
217. "Vitamin-mediated Targeting of Therapeutic and Imaging Agents to Tumors." Chemicals and Materials Enterprise Associates, Inc., Cleveland, OH, November 15, 1995. Invited.
218. "Signal Transduction of the Plant Cell Oxidative Burst." University of IL, Champaign, IL, December 7, 1995. Invited.
219. "Vitamin-mediated Delivery of Macromolecules into Cells." Merck, West Point, PA, December 13-15, 1995. Invited.
220. "Vitamin-mediated Targeting of Imaging and Therapeutic Agents." Endocyte Inc., Tampa Bay, FL, January 11, 1996. Invited.
221. "Red Cell Membrane Structure and Function." New York Blood Center, New York, NY, January 18, 1996. Invited.

222. "Vitamin-mediated Targeting of Imaging and Therapeutic Agents." ILEX Pharmaceuticals Inc., January 26, 1996. Invited.
223. "Targeting Chemotherapeutic and Imaging Agents to Cancer Cells." Mallinckrodt Company, St. Louis, MO, February 6, 1996. Invited.
224. "Use of Folate for Tumor Targeting." Proctor and Gamble Inc., Cincinnati, OH, March 7, 1996. Invited.
225. "Role of Band 3 in Red Cell Membrane Structure and Function." University of Cincinnati, Dept. of Hematology and Oncology, Cincinnati, OH, March 7, 1996. Invited.
226. "Folate-based Imaging and Therapeutic Agents for Cancer." ILEX Pharmaceuticals Inc., San Antonio, TX, March 5, 1996. Invited.
227. "Targeting Chemotherapeutic and Imaging Agents to Cancer Cells." Indiana State Univ., Dept. of Chemistry, Terre Haute, IN, March 12, 1996. Invited.
228. "Development of Folate Targeted Imaging Agents." Diatech Inc., Manchester, NH, March 15, 1996. Invited.
229. "Targeting of Chemotherapeutic and Imaging Agents to Cancer Cells." Shanghai Institute of Biochemistry, Shanghai, China, June 30, 1996. Invited.
230. "Folate-linked Imaging Agents." Mallinckrodt, Inc., St. Louis, MO, May 8, 1996. Invited.
231. "Folate-targeted Cancer Cell Delivery." National Cancer Institute, Bethesda, MD, June 5, 1996. Invited.
232. "Targeting of Imaging Agents to Tumors." Bracco Inc., Newark, NJ, June 12, 1996 Invited.
233. "Folate-mediated Targeting of Protein Nucleic Acid Cytotoxic Drugs and Imaging Agent to Cancer Cells." Institute of Cell Biology National Academy of Sciences, Shangha Institute of Biochemistry, Shanghai, China, July 3, 1996. Invited.
234. "Folate-mediated Targeting of Protein Nucleic Acid Cytotoxic Drugs and Imaging Agent to Cancer Cells." 23rd International Symposium on Controlled Release of Bioactive Materials, Osaka, Japan, July 10, 1996. Invited.
235. "Signal Transduction Pathways of the Oxidative Burst in Plant Cells." 8th International Congress Conference on Molecular Plant-Microbe Interactions, Knoxville, TN, July 14, 1996. Invited.
236. "Folate-mediated Delivery of Imaging Agents to Cancer Cells". DuPont-Merck, Boston, MA, Sept. 25, 1996. Invited.
237. "Evaluation of Novel Vitamins for Drug Targeting." Merck Company, Philadelphia, PA, Oct. 1, 1996. Invited.
238. "Signal Transduction Pathways of the Oxidative Burst in Plant Cells." University of Western Ontario, London, Ontario, Canada, October 16, 1996. Invited.
239. "The Cytoplasmic Domain of the Anion Exchanger, Band 3." American Society of Nephrology, New Orleans, LA, November 2, 1996. Invited.
240. "Folate-mediated Targeting of Therapeutic Agents to Cancer Cells." ISIS Pharmaceuticals, San Diego, CA, December 4, 1996. Invited.
241. "Folate-mediated Delivery of Chemotherapeutic Agents." Merck, Philadelphia, PA, January 26, 1997. Invited.
242. "Folate-mediated Delivery of Imaging Agents." DuPont-Merck, Princeton, NJ, January 27, 1997. Invited.

243. "Folate-mediated delivery of Drugs, Imaging Agents and Genes to Tumor Cells." 8th International symposium on Recent Advances in Drug Delivery Systems, Univ. of Utah, Salt Lake City, UT, February 21, 1997. Invited.
244. "Signal Transduction Pathways of Erythrocytes and their Functions." Oakland's Children's Research Hospital, Oakland, CA, March 12, 1997. Invited.
245. "Signal Transduction Pathways of Erythrocytes and their Functions." Univ. of California, Berkeley, CA, March 13, 1997. Invited.
246. "Folate-Mediated Targeting of Therapeutic Agents to Cancer Cells." Merck Inc., Philadelphia, PA, April 7, 1997. Invited.
247. "Folate-Mediated Targeting of Therapeutic Agents to Cancer Cells." Bristol-Myers-Squibb, Princeton, NJ, April 8, 1997. Invited.
248. "Folate-Mediated Targeting of Drugs, Imaging Agents, and Genes to Tumor Cells." American Society of Pharmaceutical Scientists Meeting, Raleigh, NC, June 23, 1997. Invited.
249. "Vitamin-Mediated Targeting to Tumors." Glaxo-Wellcome Inc., Research Triangle Park, NC, June 24, 1997. Invited speaker.
250. "Design of a Trojan Horse for Treatment of Cancer." Purdue University Retirees Meeting, July 7, 1997. Invited speaker.
251. "Molecular Communication Between Red Cells and Platelets." Red Cell Gordon Conference, Tilton School, NH, July 14, 1997. Invited speaker.
252. "Folate-Mediated Targeting of Imaging and Therapeutic Agents to Tumors." Mogam Biotechnology Research Institute, Seoul, Korea, September 3, 1997. Invited speaker.
253. "Folate-Mediated Targeting of Imaging and Therapeutic Agents to Tumors." Pohang University, Pohang, Korea, September 5, 1997. Invited speaker.
254. "Structure and Function of the Red Cell Membrane." Univ. of Pohang, Pohang, Korea, September 8, 1997. Invited speaker.
255. "Folate-Targeted Imaging Agents." Mallinkrodt Inc., St. Louis, MO, September 16, 1997. Invited speaker.
256. "Folate-mediated Drug Targeting to Cancer Cells." Bristol Myers Squibb Inc., Princeton, NJ, October 7, 1997. Invited speaker.
257. "Signal Transduction in Erythrocyte Transport Processes." Duke University, Beaufort, NC, October 11-14, 1997. Invited speaker.
258. "Use of Folate to Enhance Gene Therapy of Cancer." Genetic Therapy Inc., Gaithersburg, MD, October 22-23, 1997. Invited speaker.
259. "Folate Targeted Agents for the Diagnosis and Treatment of Cancer." National Cancer Institute, Bethesda, MD, December 1-16, 1997. Invited speaker.
260. "Folate Targeted Agents for the Diagnosis and Treatment of Cancer", NIH Conference on "New Tumor Targeting Technologies." Washington, D.C., February 23, 1998. Invited speaker.
261. "Signal Transduction Pathways of the Oxidative Burst." 5$^{th}$ International Workshop on Pathogenesis-Related Proteins in Plants Signalling Pathways and Biological Activities, Aussois, France, March 29-April 2, 1998. Invited speaker.
262. "Folate-Mediated Targeting of Imaging and Therapeutic Agents to Cancers." 5$^{th}$ European Symposium on Controlled Drug Delivery, Noordwijk Aan zee, Netherlands, April 1, 1998. Invited speaker.

263. "Signal Transduction Pathways of the Plant Oxidative Burst." Univ. of Nebraska, Lincoln, NE, April 17, 1998. Invited speaker.
264. "Folate-Mediated Targeting of Imaging and Therapeutic Agents to Cancers." Sigma Xi Award Lecture, Purdue University, April 22, 1998. Invited speaker.
265. "Folate-mediated Targeting of Imaging and Therapeutic Agents to Tumors." Rhone-Poulenc, Philadelphia, PA, April 26, 1998. Invited speaker.
266. "Folate-mediated Targeting of Imaging and Therapeutic Agents to Tumors." International Conference on Gene Therapy and Molecular Biology, Iraklion, Crete, August 16-22, 1998. Invited speaker.
267. "Folate-mediated targeting of imaging and therapeutic agents to tumors." Rhone-Poulence-Rorer, Vitry, France, September 2, 1998. Invited speaker.
268. "Folate-mediated gene therapy of cancer." GenCell Inc., San Francisco, CA, September 10, 1998. Invited speaker.
269. "Novel Approaches ton Chemotherapy of Cancer." Frontiers in Science, Purdue University, West Lafayette, IN, October 2, 1998. Invited speaker.
270. "Folate-Mediated Targeting of Therapeutic and Imaging Agents to Cancer Cells." Sigma Xi Award Lecture, Purdue University, October 7, 1998. Invited lecture.
271. "Folate-mediated targeting of diagnostic and therapeutic agents to cancer cells." Medical College of Ohio, Toledo, OH, November 4, 1998. Invited speaker.
272. "Structure of the Red Cell Membrane." Heidelberg College, Tiffin, OH, November 5, 1998. Invited speaker.
273. "Novel Approaches to chemotherapy of Cancer." Rotary Club of Lafayette, November 17, 1998. Invited speaker.
274. "Folate-Mediated Targeting of therapeutic and Imaging Agents to Cancer Cells." Bioanalytical Systems, West Lafayette, IN, November 19, 1998. Invited speaker.
275. "Folate Targeted Agents for the Diagnosis and Treatment of Cancer." National Cancer Institute, Bethesda, MD, December 15-16, 1998. Invited speaker.
276. "Role of $Ca^{++}$ Release from Intracellular and Extracellular Compartments in Signal Transduction of the Oxidative Burst." U. S. - Japan Symposium on Vacuole Function, Kona, Hawaii, January 10-14, 1999. Invited speaker.
277. "Folate-Targeted Cancer Imaging Agents." University-Wide Workshop on Imaging/Bio-Imaging, Purdue University, January 16, 1999. Invited speaker.
278. "Structural Studies of the Cytoplasmic Domain of Band 3." European Society for Red Cell Research Meetings, Otzenhausen, Germany, April 15-19, 1999. Invited speaker.
279. "Folate-Mediated Targeting of Therapeutic and Imaging Agents to Cancer Cells." Purdue University Board of Trustees, April 30, 1999. Invited speaker.
280. "Folate-Mediated Targeting of Therapeutic and Imaging Agents to Cancer Cells." Seoul Institute for Cancer Research, Seoul, Korea, May 10, 1999. Invited speaker.
281. "Signal Transduction Pathways of the Oxidative Burst in Plants." Pohang University, Pohang, Korea, May 11, 1999. Invited speaker.
282. "Red Cell Membrane Structure and Its Role in Blood Clotting." Pohang University, Pohang, Korea, May 12, 1999. Invited speaker.
283. "Structure of the Human Erythrocyte Membrane." Tokyo Women's University, Tokyo, Japan, May 14, 1999. Invited speaker.

284. "Folate Targeting of Imaging and Therapeutic Agents to Tumors." 26th International Symposium on Controlled Release of Bioactive Materials, Boston, MA, June 24-25, 1999. Invited speaker.
285. "Band 3 Structure and Function." European Society for Comparative Physiology and Biochemistry, Aarhus, Denmark, June 27-30, 1999. Invited speaker.
286. "Folate Targeting of Imaging and Therapeutic Agents to Tumors." Philippe's Universität, Marburg, Germany, July 5, 1999. Invited speaker.
287. "Folate-Mediated Targeting of Imaging and Therapeutic Agents to Tumors." Purdue Cancer Center Retreat, September 10, 1999. Invited speaker.
288. "Folate-Mediated Targeting of Imaging and Therapeutic Agents to Tumors." Retired Officers Association, September 13, 1999. Invited speaker.
289. "Targeting of therapeutic and Imaging Agents to Tumors." Hillsdale College, Hillsdale, MI, September 21, 1999. Invited speaker.
290. "Folate-Mediated Targeting of Imaging and Therapeutic Agents to Tumors." Schering Corporation, Berlin, Germany, October 8, 1999. Invited speaker.
291. "Folate-Mediated Targeting of Imaging and Therapeutic Agents to Tumors." Amersham Corporation, London, U.K., October 10, 1999. Invited speaker.
292. "Folate-Mediated Targeting of Imaging and Therapeutic Agents to Tumors." University of Amsterdam School of Medicine (Onderzoekinstitut Oncologie Vrije Universiteit), October 11, 1999. Invited speaker.
293. "Folate-Mediated Targeting of Imaging Agents to Tumors: Results of Human Clinical Trials." Bracco, Inc. Philadelphia, PA, October 24, 1999. Invited speaker.
294. "Structure and Regulation of the Human Erythrocyte Membrane." Biomedical Engineering Institute, Florida International University, January 13, 2000. Invited speaker.
295. "Structure and Functional Interpretation of the Cytoplasmic Domain of Erythrocyte Membrane Band 3." Jacobs-Parpart-Ponder Lecture, Red Cell Club, Biophysical Society Meetings, New Orleans, February 13, 2000. Invited speaker.
296. "Folate-Mediated Targeting of Imaging and Therapeutic Agents to Tumors." Huntsman Cancer Institute, University of Utah, Salt Lake City, March 25, 2000. Invited speaker.
297. "Folate-Mediated Imaging and Therapy of Cancer." Indiana University Medical School, May 12, 2000. Invited speaker.
298. "Signal Transduction of the Plant Oxidative Burst." Plant Signaling: 2000 Conference, Penn State, University Park, PA, May 18, 2000. Invited speaker.
299. "Structure, Function and Regulation of Erythrocyte Membrane Band 3." International InterSocieties Meeting of Biological Sciences, Cambridge, England, July 30, 2000. Invited speaker.
300. "Folate-Targeted Gene Therapy." Gene/Drug Therapy and Molecular Biology Conference, Rhodes, Greece, August 26-31, 2000. Invited speaker.
301. "Folate-Mediated Targeting of Imaging and Therapeutic Agents to Tumors." International Symposium on Tumor Targeted Delivery Systems, National Cancer Institute, Bethesda, September 25, 2000. Invited speaker.
302. "Folate-Targeted Gene Therapy." European Society of Gene Therapy symposium, Stockholm Sweden, October 9, 2000. Invited speaker.
303. "Crystal Structure of the Cytoplasmic Domain of Band 3." Red Cell Club meeting, Yale University, New Haven, CT, October 14, 2000. Invited speaker.

304. "Use of Receptor-Mediated Endocytosis in Drug Delivery." American Association of Pharmaceutical Scientists National Meeting (AAPS), Indianapolis, IN, November 1, 2000. Invited speaker.
305. "Folate-Mediated Targeting of Imaging and Therapeutic Agents to Cancers." Bristol-Myers Squibb Corp., Princeton, NJ, November 21, 2000. Invited speaker.
306. "Folate-Mediated Targeting of Therapeutic and Imaging Agents to Cancer Cells." University of Wisconsin, Dept. of Pharmaceutical Sciences, December 15, 2000. Invited speaker.
307. "Structure and Regulation of the Human Erythrocyte Membrane." Biomedical Engineering Institute, Florida International University, January 13, 2000. Invited speaker.
308. "Tumor-Specific Targeting of Therapeutic and Imaging Agents." Diachi, Inc., Japan, February 2, 2001. Invited speaker.
309. "Tumor-Specific Targeting of Imaging Agents: Human Clinical Trial Results." Nihon Medi-Physics, Tokyo, Japan, February 2, 2001. Invited speaker.
310. "Novel Folate-Linked Cancer Therapies." Pohang University, Korea, February 5, 2001 Invited speaker.
311. "Signal Transduction of the Plant Oxidative Burst." Pohang Winter Conference, Pohang, Korea, February 5, 2001. Invited speaker.
312. "Tumor-Specific Targeting of Therapeutic and Imaging Agents to Tumors." Brigham Young University, Provo, Utah, February 9, 2001. Invited speaker.
313. "Targeting of Imaging and Therapeutic Agents to Cancers." IGERT Seminar Series, Biomedical Engineering, Purdue University, February 27, 2001. Invited speaker.
314. "Applications of Folate-Targeting to Ovarian Cancer." Ovarian Cancer Discussion Group, Indiana University Cancer Center, February 28, 2001. Invited speaker.
315. "Targeting of Toxins to Cancer Cells." Transylvania University, Lexington, KY, March 6, 2001. Invited speaker.
316. "Folate-mediated Delivery of Therapeutic and Imaging Agents to Cancer Cells and Activated Macrophages." National Institute of Dental and Craniofacial Research, NIH, Bethesda, MD, March 27, 2001. Invited speaker.
317. "The Folate Receptor as a Target for Imaging and Therapeutic Agents." Conference on Molecular Determinants of Antifolate Response and Toxicity, Dunkeld, Scotland, April 30-May 3, 2001. Invited speaker.
318. "Folate-Targeted Imaging and Therapeutic Agents for Cancer." Elan Ltd., Dublin, Ireland, May 4, 2001. Invited speaker.
319. "Folate-Targeted Drugs for the Diagnosis and Treatment of Cancer and Inflammatory Diseases." British Pharmaceutical Society Workshop, University College, Dublin, Ireland, July 2-5, 2001. Invited speaker.
320. "Function of Linkages between the Erythrocyte Membrane and the Spectrin Skeleton." Red Cell Gordon Conference, Tilton School, NH, July 22-27, 2001. Invited speaker.
321. "The Use of Folate Receptors as Diagnostic Aids and Receptor Targets for the Treatment of Solid Tumors." British Pharmaceutical Society Annual Meeting, Glascow, Scotland, September 23-26, 2001. Invited speaker.
322. "Folate-Targeted Gene Therapy." Targeted Genetics Co., Seattle, WA, October 1-2, 2001. Invited speaker.

323. "Structure and Function of Band 3." American Society of Hematology meetings, Orlando, FL, Dec. 10, 2001. Invited speaker.
324. "Folate-Mediated Targeting of Imaging and Therapeutic Agents to Cancer Cells." Controlled Release Society, Purdue University, January 22, 2002. Invited speaker.
336. "Folate-Mediated Targeting of Novel Cancer Therapeutic Agents." Undergraduate seminar, Triton College, Chicago, IL, February 12, 2002. Invited speaker.
337. "Folate-Mediated Targeting of Therapeutic and Imaging Agents to Cancer Tissues." Children's Hospital of Oakland Research Institute, Oakland, CA, May 1-3, 2002. Invited speaker.
338. "Folate-Mediated Targeting of Therapeutic and Imaging Agents to Cancer Tissues." Dept. of Pathology, Northwestern University Medical School, Chicago, IL, May 12-13, 2002. Invited speaker.
339. "Role of Band 3 in the Structure and Function of the Erythrocyte Membrane." Harvard University Medical School, Dana Farber Cancer Institute, Boston, MA, May 16, 2002. Invited speaker.
340. "Folate-Mediated Targeting of Imaging and Therapeutic Agents to Cancer Cells" and "Role of Band 3 in the Structure and Function of the Erythrocyte Membrane." University of Bucharest, Bucharest, Romania, May 30-31, 2002. Invited speaker.
341. "Folate-Mediated Targeting of Imaging and Therapeutic Agents to Cancer Cells." U.C. Irvine, Cancer Research Institute, Inaugural Symposium for Sprague Hall, June 5, 2002. Invited speaker.
342. "Folate-Targeted Therapies for Cancer." Novartis, Newark, NJ, July 10, 2002. Invited speaker.
343. "Folate-Targeted Therapies for Cancer." Harvard University Medical School, Boston, MA, July 11, 2002. Invited speaker.
344. "Folate-Targeted Therapeutic Drugs." Walther Cancer Retreat, August 8-10, 2002. Invited speaker.
345. "Folate-Targeted Therapies for Cancer and Rheumatoid Arthritis." Mayo Clinic, Rochester, MN, September 12-13, 2002. Invited speaker.
346. "Folate-Targeted Therapies for Cancer and Rheumatoid Arthritis." Princeton, NJ, September 18, 2002. Invited speaker.
347. "Folate-Targeted Therapies for Arthritis and Cancer." Merck, Philadelphia, PA, October 18, 2002. Invited speaker.
348. "Receptor-Targeted Therapeutics for Cancer." Baylor University, Houston, TX, December. 10, 2002. Invited speaker.
349. "Receptor-targeted Agents for the Imaging and Therapy of Cancer and Inflammatory Diseases." University of Alberta, Edmonton, Alberta, Canada, July 11, 2003. Invited speaker.
350. "Receptor-targeted Therapies for Cancer and Autoimmune Diseases." 30th Annual Symposium of the Controlled Release Society, Glasgow, Scotland, July 19-23, 2003. Invited speaker.
351. "Folate-targeted Therapies for Cancer." James Cancer Center, Ohio State University, Columbus, OH, August 1, 2003. Invited speaker.
352. "Receptor-targeted Imaging and Therapeutic Agents for Cancer and Inflammatory Diseases." Annual meeting of the Society for Molecular Imaging, San Francisco, CA, August 15-18, 2003. Invited speaker.

353. "Folate-targeted Imaging and Therapeutic Agents for Cancer and Inflammatory Diseases." Ovarian Cancer Support Group, Methodist Hospital Indianapolis, September 4, 2003. Invited speaker.
354. "Receptor-mediated Targeting of Imaging and Therapeutic Agents to Cancer and Inflammatory Diseases." Georgia State University, Atlanta, GA, Sept. 11-12, 2003. Invited speaker.
355. "Folate Targeting of Imaging and Therapeutic Agents to Cancer Cells in vivo." University of Minnesota, Minneapolis, MN, October 2-3, 2003. Invited speaker.
356. "Receptor Targeted Therapies for Inflammatory and Autoimmune Diseases." Dept. of Microbiology and Immunology, I.U. Medical School, Indianapolis, IN, November 7, 2003. Invited speaker.
357. "Folate-targeted Therapies for Cancer and Inflammatory Diseases." to Scientech Club of Indianapolis, Indianapolis, IN, November 10, 2003. Invited speaker.
358. "Receptor-targeted Therapies for Cancer and Inflammatory Diseases." University of Pennsylvania, Philadelphia, PA, November 11, 2003. Invited speaker.
359. "Regulation of Glycolytic Enzymes Binding to the Erythrocyte Membrane." American Society of Hematology meetings, San Diego, CA, December 6-9, 2003. Invited speaker.
360. "Biochip for Rapid Identification of Pathogens." HSARPA Bioinformatics and Advanced Assay Development for Homeland Defense Conference, Washington, DC, February 3, 2004. Invited speaker.
361. "The Organization and Function of Proteins on the Inner Surface of the Red Cell Membrane." Department of Physiology and Department of Biochemistry, University of Alberta Edmonton, February 9, 2004. Invited speaker.
362. "Targeting of Drugs to Cancer and Other Pathologic Cells." Invited guest of Dr. Martin Jischke at the President's Executive Roundtable Breakfast, Lafayette, IN, May 4, 2004. Invited speaker.
363. "Folate-receptor Targeted Drugs for Cancer and Inflammatory Diseases." Mayo Clinic, Rochester, MN, March 25, 2004. Invited speaker.
364. "Architecture and Regulation of the Glycolytic Enzyme Complex on the Human Erythrocyte Membrane." CSIRO, University of Melbourne, April 7, 2005. Invited speaker.
365. "Structural Organization of the Erythrocyte Membrane." Yale University Retirement Symposium for Professor Joseph Hoffmann, New Haven, CT, April 23, 2004. Invited speaker.
366. "Folate Receptor-targeted Therapies for Cancer and Inflammatory Diseases." 9th Liposome Research Days Conference, Taipei, Taiwan, May 12-15, 2004. Invited Keynote Speaker.
367. "Folate-Targeted Therapies for Cancer and Inflammatory Diseases: A Single Solution for Delivery and Specificity Problems." Pharmaceutical Education Associates Conference on Prodrugs in Medicine, Philadelphia, PA, June 28-29, 2004. Invited speaker.
368. "Folate-Targeted Therapies for Cancer." Baylor College of Medicine, Houston TX, July 13, 2004. Invited speaker.
369. "Folate receptor-targeted imaging and therapeutic agents for inflammatory and autoimmune diseases." Department of Rheumatology, Mayo Clinic, August 24, 2004. Invited speaker.

370. "Structure and Function of the Human Erythrocyte Membrane." New York Blood Center, New York, NY, September 3, 2004. Invited speaker.
371. "Folate Receptor-targeted Therapies for Cancer and Inflammatory Diseases." Indiana University, Bloomington, IN, October 1, 2004. Invited speaker.
372. "Rapid Pathogen Capture, Detection, and Therapy by Immutable Ligand Binding." DTRA, Washington DC, October 13, 2004. Invited speaker.
373. "Folate Receptor-targeted Therapies for Cancer and Inflammatory Diseases." Pfizer Pharmaceuticals Inc., Ann Arbor, MI, November 2, 2004. Invited speaker.
374. "Structure and Regulation of the Human Erythrocyte Membrane." International Conference on Physiological Biophysics, Shanghai, China, November 9-13, 2004. Invited Plenary Lecture.
375. "Folate Receptor-targeted Therapies for Cancer and Inflammatory Diseases." Jiao Tong University, Shanghai, China, November 9, 2004. Invited speaker.
376. "Folate Receptor-targeted Therapies for Cancer and Inflammatory Diseases." Shanghai Second Medical School, November 10, 2004. Invited speaker.
377. "Receptor-targeted Nanotechnologies for Cancer and Inflammatory Diseases." Bindley Bioscience Center Exchange with Mayo Clinic Doctors, Rochester, MN, November 15, 2004. Invited speaker.
378. "Structure and Function of the Human Erythrocyte Membrane." Southeast Wisconsin Blood Center, Milwaukee, WI, November 30, 2004. Invited speaker.
379. "Everything you wanted to know about red cells." Meet the Expert Session, American Society of Hematology, San Diego, CA, December 5, 2005. Invited speaker.
380. "Structure and Function of the Human Erythrocyte Membrane." University of Cincinnati, Cincinnati OH, January 6, 2005. Invited speaker.
381. "Recent Discoveries in Red Cell Structure and Function." New York Blood Center, New York, NY, January 25, 2005. Invited speaker.
382. "Receptor-targeted Therapies for Cancer and Inflammatory Diseases." Department of Biochemistry, University of Wisconsin, Madison, WI, February 7, 2005. Invited speaker.
383. "Receptor-targeted Therapies for Cancer and Inflammatory Diseases." Austin Research Institute, Melbourne, Australia, March 17, 2005. Invited speaker.
384. "Targeted Liposomes and Gene Therapy Vectors." Austin Research Institute, Melbourne, Australia, March 24, 2005. Invited speaker.
385. "Architecture and regulation of the glycolytic enzyme complex on the human erythrocyte membrane." CSIRO, University of Melbourne, April 7, 2005. Invited speaker.
386. "Folate Receptor-targeted Therapies for Inflammatory Diseases." Pfizer Pharmaceuticals Inc., Ann Arbor, MI, April 27, 2005. Invited speaker.
387. "Structure and Function of Protein Complexes of the Human Erythrocyte Membrane." Yale University School of Medicine, New Haven CN, May 12, 2005. Invited speaker.
388. "Folate Receptor-targeted Therapies for Cancer and Inflammatory Diseases." Karmanos Cancer Center, Detroit MI, May 18, 2005. Invited speaker.
389. "Protein Complexes of the Human Erythrocyte Membrane." National Institute of Diabetes and Infectious Disease, Bethesda MD, May 20, 2005. Invited speaker.
390. "Receptor-targeted Therapies for Cancer and Inflammatory Diseases." Department of Cell Biology, University of Alberta, Edmonton, Canada, May 30, 2005. Invited speaker.

391. "Ligand-mediated Targeting of Liposomes and Nanoparticles to Cancer Cells and Pathogenic Microbes." Particles 2006 Conference, Orlando, FL, May 14, 2006. Invited speaker.
392. "Organization of protein complexes on the cytoplasmic domain of band 3." Red Cell Gordon Conference, Tilton School, NH, June 14, 2005. Invited speaker.
393. "Folate Receptor-Targeted Therapeutics: From Basics to Clinical Results." 13th International Symposium on Chemistry & Biology of Pteridines & Folates, Egmond Aan Zee, The Netherlands, June 19-24, 2005. Invited speaker.
394. "Folate Receptor-targeted Therapies for Cancer and Inflammation." Alnylam Pharmaceuticals, Boston, MA, March 17, 2006. Invited speaker.
395. "Los Dose Irradiation or Folate-CpG Enhances the Efficacy of Folate-hapten Targeted Immunotherapy." American Association for Cancer Research, 97th Annual Meeting, Washington, DC, March 31, 2006. Invited speaker.
396. "Ligand-mediated Targeting of Nanoparticles and Low Molecular Weight Drugs to Cancer Cells." Particles 2006 Conference, Orlando, FL, May 13, 2006. Invited speaker.
397. "Receptor Targeted Imaging and Therapeutic Agents for Cancer and Inflammatory Disease." University of Illinois Medical School, Chicago, IL, May 25, 2006. Invited speaker.
398. "Receptor-targeted Therapies for Cancer and Inflammatory Diseases." Gordon Conference, Bozeman, MT, August 1, 2006. Invited speaker.
399. "Folate Receptor-targeted Therapies for Cancer and Inflammation." Merck Eprova AG, Zurich, Switzerland, September 4, 2006. Invited speaker.
400. "Folate Receptor-targeted Therapies for Cancer and Inflammation." University of Missouri, Columbia, MO, September 20, 2006. Invited speaker.
401. "Receptor-targeted Therapies for Cancer and Inflammatory Diseases." University of Chicago, Chicago, IL, October 2, 2006. Invited speaker.
402. "Development of Novel Diagnostics for Human and Animal Health." IDEXX, Portland, ME, October 9, 2006. Invited speaker.
403. "Selective Targeting of Drugs to Activated Macrophages: Use in Imaging and Therapy of Inflammatory Diseases." 14th International Conference of Inflammation Research Association, Cambridge, ME, October 16, 2006. Invited speaker.
404. "Receptor-targeted Imaging of Inflammation." Merck, Philadelphia, PA, October 23, 2006. Invited speaker.
405. "Detection of Pathogens by Immutable Ligands." Neogen, Lansing, MI, October 2006. Invited speaker.
406. "Receptor-targeted Therapies for Cancer and Inflammatory Diseases." Medical School, Chicago, IL, November 2, 2006. Invited speaker.
407. "Receptor-targeted Imaging and Therapeutic Agents for Cancer and Inflammation." National Institute of Health, Bethesda, MD, November 28, 2006. Invited speaker.
408. "Receptor-targeted Therapies for Cancer and Inflammatory Diseases." Methodist Hospital, Houston, TX, December 14, 2006. Invited speaker.
409. "Folate Receptor-targeted Therapies for Inflammatory Diseases and Cancer." Amgen, Inc., Seattle, WA, January 29, 2007. Invited speaker.
410. "Folate Receptor-targeting of Macromolecular Therapeutics for the Treatment of Cancer and Inflammatory Diseases." International Symposium on Polymer Therapeutics, Berlin, Germany, February 19, 2007. Invited speaker.

411. "Folate Receptor-targeted Therapies for Inflammatory Diseases and Cancer." Division of Medicinal Chemistry and Natural Products at the University of North Carolina, Chapel Hill, NC, March 7, 2007. Invited speaker.
412. "Folate Receptor-targeted Therapies for Inflammatory Diseases and Cancer." University of Wyoming, Laramie, WY, March 18, 2007. Invited speaker.
413. "Folate Receptor-targeted Therapies for Inflammatory Diseases and Cancer." Illinois Institute of Technology symposium, Chicago, IL, April 20, 2007. Invited Speaker.
414. "Folate Receptor-targeted Therapies for Inflammatory Diseases and Cancer." Univ. of Pennsylvania School of Medicine, Philadelphia, PA, May 7, 2007. Invited Speaker.
415. "Signaling in Mature and Developing Red Cells." 2007 Red Cell Gordon Conference, Aussois, France, May 14, 2007. Invited speaker.
416. "Folate Receptor-targeted Therapies for Inflammatory Diseases and Cancer." 8th Annual NIH Training Grant Symposium, Minneapolis, MN, May 30, 2007. Invited speaker.
417. "Folate Targeted Therapies for Inflammatory Diseases." Dept. of Rheumatology at Duke Medical School, Duke University, Durham, NC, June 21, 2007. Invited speaker.
418. "Optical Imaging of Cancer Cells in vivo with Folate Receptor-targeted Fluorescent Dyes." Microscopy Society of America Conference, Ft. Lauderdale, FL, August 6, 2007. Invited speaker.
419. "Folate-targeted Imaging and Therapeutic Agents for Autoimmune and Inflammatory Diseases." Eli Lilly, Indianapolis, IN, August 13, 2007. Invited speaker.
420. "Folate Targeted Therapies for Cancer Inflammation." LDS Life Science Research Symposium, Salt Lake City, UT, August 17, 2007. Invited speaker.
421. "Folate Receptor-targeted Therapies for Inflammatory Diseases" and "Folate Receptor-targeted Therapies for Cancer." American Chemical Society Symposium on Tumor-targeting Drug Delivery, Boston, MA, August 19, 2007. Invited speaker.
422. "Receptor Targeted Therapies for Cancer, Autoimmune and Inflammatory Diseases." Eli Lilly Corporate Headquarters, Indianapolis, IN, September 20, 2007. Invited speaker.
423. "Receptor Targeted Therapies for Cancer, Autoimmune and Inflammatory Diseases." Merck, Rahway, NJ, September 24, 2007. Invited speaker.
424. "Receptor Targeted Therapies for Cancer, Autoimmune and Inflammatory Diseases." Alnylam's Quarterly SAB Meeting, Cambridge, MA, October 10, 2007. Invited speaker.
425. "Study of Band 3 Lateral Diffusion in Normal and Pathologic Red Blood Cells by Single Particle Tracking." 2007 Red Cell Conference, Boston, MA, October 26, 2007. Invited speaker.
426. "Imaging of Activated Macrophages at Sites of Inflammation." American College of Rheumatology Annual Scientific Meeting, Boston, MA, November 6, 2007. Invited speaker.
427. "Applications of High Affinity Ligands in the Treatment of Cancer, Sickle Cell Anemia, Inflammatory Disorders and Autoimmune Diseases." National Cancer Institute, Washington, DC, January 24, 2008. Invited speaker.
428. "Structure of the Human Erythrocyte Membrane." National Institutes of Health, Bethesda, MD, January 25, 2008. Invited speaker.
429. "Folate Receptor-targeted Therapies for Cancer and Inflammation." Brigham Young University, Provo, UT, February 14, 2008. Invited speaker.

430. "Receptor-targeted Therapies for Cancer and Inflammation: Obstacles and Opportunities for Nanotechnology." The Future of Nanotechnology for Targeted Drug Delivery Conference, Boston, MA, February 25-27, 2008. Invited speaker.
431. "Folate Receptor-targeted Therapies for Cancer and Inflammation." University of Arizona College of Pharmacy, University of Arizona, Tucson, AZ, February 28, 2008. Invited speaker.
432. "Folate Receptor-targeted Therapies for Cancer and Inflammation." University of Louisville, Louisville, KY, March 11, 2008. Invited speaker.
433. "Folate Receptor-targeted Therapies for Cancer and Inflammation." University of Puerto Rico, San Juan, Puerto Rico, March 25, 2008. Invited speaker.
434. "Folate Receptor-targeted Delivery of siRNA for Treatment of Cancer and Inflammation." Roche Pharmaceuticals, Lyndhurst NJ, April 1, 2008.
435. "Folate Receptor-targeted Therapies and Imaging Agents for Cancer." Dept. of Oncology, Mayo Clinic, Rochester, MN, April 10, 2008. Invited speaker.
436. "Rapid and Accurate Pathogen Identification and Detection." IEEE 2008 International Conference on Technologies for Homeland Security, Waltham, MA, May 12, 2008. Invited speaker.
437. "Folate Receptor-targeted Therapies for Cancer and Inflammation." Paul Scherer Institut, Villigen, Switzerland, May 20, 2008. Invited speaker.
438. "Folate Receptor-targeted Therapies for Cancer and Inflammation." ETH Zurich, Zurich, Switzerland, May 21, 2008. Invited speaker.
439. "Structure and Function of the Red Cell Membrane", "Single Particle Tracking of Protein Diffusion in the Red Cell Membrane", "Structure and Regulation of a Glycolytic Enzyme Complex on the Red Cell Membrane", University of Verona, Verona, Italy, May 23, 24, 2008. Invited speaker.
440. "Folate-targeted Liposomal Therapy for Cancer." 2008 NCI/NSTI Cancer Nanotechnology Symposium, Hynes Convention Center, Boston, MA, June 4, 2008. Invited speaker.
441. "Ligand-mediated Targeting of siRNAs and Other Therapeutic Agents to Cancer Tissues and Sites of Inflammation." Therapeutic Opportunities of siRNA and Antigomers, New York Academy of Sciences Meeting, Manhattan, NY, June 10, 2008. Invited speaker.
442. "Folate Receptor-targeted Therapies for Cancer and Inflammation." Controlled Release Society Annual Meeting, New York City, NY July 12-16, 2008. Invited speaker.
443. "Folate Receptor-targeted Therapies for Cancer and Inflammation." FASEB meeting on Folate and B12, IL Ciocco, Italy, August 10-15, 2008. Invited speaker.
444. Gordon Conference on Drug Carriers in Medicine & Biology, Big Sky, MT, August 24-29, 2008. Co-chair of conference.
445. "Receptor-targeted Therapies for Cancer, Infection and Inflammation." University of Nebraska Medical School, September 17-18, 2008. Invited speaker.
446. "Folate Receptor-targeted siRNA Therapies for Cancer and Inflammation." The Fourth Annual Meeting of the Oligonucleotide Therapeutics Society, Harvard Conference Center, Boston, MA, October 15-18, 2008. Invited speaker.
447. "Folate Receptor-targeted Therapies for Cancer and Inflammation." Folate Receptors and Transporters Annual Meeting, Lake Cuomo, Italy, October 26-30, 2008. Invited speaker.

448. "Ligand-Targeting of Nanoparticles and Low Molecular Weight Drugs to Cancer Cells and Inflammatory Immune Cells in Vivo." Nanobiology Seminar Series at NIH, Rochester, MN, November 21, 2008. Invited speaker.
449. "Ligand-Targeted Nano-Therapies for Cancer, Infectious, and Inflammatory Diseases." 1st Joint U.S.-China Symposium on Nanobiology and Nanomedicine, Beijing, China, October 21-23, 2008 (organized by the National Institutes of Health (NIH), The National Center for Nanosciences and Technology, China (NCNT), and The Chinese Academy of Sciences (CAS)). Invited speaker.
450. "Control of Protein Diffusion in the Human Erythrocyte Membrane." Red Cell Club Annual Meeting, Rochester NY, October 23-25, 2008. Invited speaker.
451 "Folate Receptor-Targeted Therapies for Cancer and Inflammation." Folate Receptors and Transporters Annual Meeting, Lake Cuomo, Italy, October 26-30, 2008. Invited speaker.
452 "Ligand-Targeting of Nanoparticles and Low Molecular Weight Drugs to Cancer Cells and Inflammatory Immune Cells in Vivo." Nanobiology Seminar Series at NIH. Invited speaker.
453. "Targeting of activated macrophages with folate conjugated drugs." Wyeth Laboratories, Cambridge, MA, February 4, 2009. Invited speaker.
454. "Ligand-targeted imaging and therapeutic agents for cancer and inflammatory diseases." University of California, San Diego, February 10, 2009. Invited speaker.
455. "Research and commercialization opportunities at Purdue University." Purdue Foundation, Naples, FL, February 14, 2009. Invited speaker.
456. "Ligand-Targeted Molecules for Imaging and Therapy of Cancer and Inflammatory Diseases." Emory University, Atlanta, GA, March 8-9, 2009. Invited speaker.
457. "Ligand-Mediated Targeting of Therapeutic Agents to Cancer Tissues and Sites of Inflammation." Congress on Frontiers in Medicinal Chemistry; Joint German-Swiss Meeting on Medicinal Chemistry, Heidelberg, Germany, March 15-18, 2009. Invited plenary Lecturer.
458. "Trafficking of Folate and Folate Conjugates During Folate Receptor-Mediated Endocytosis." NIH Workshop on Folate Metabolism and Autism Spectrum Disorders, Washington DC March 19 and 20, 2009. Invited speaker.
459. "Ligand-Mediated Targeting of Therapeutic Agents to Cancer Tissues and Sites of Inflammation." University of Puerto Rico, Humacao, Puerto Rico, March 28-30, 2009. Invited speaker.
460. "Rapid and Accurate Pathogen Identification and Detection." Department of Defense, Wahington D.C. April 16-17, 2009. Invited speaker.
461. "Evaluation of Band 3 Diffusion and Spectrin Compartment Size by Single Particle Tracking." European Association for Red Cell Research (EARCR) 2009, Triuggio (Milano) Italy, April 23-27, 2009. Invited speaker.
462. "Receptor-Targeted Therapeutic and Imaging Agents for Cancer and Inflammatory Diseases." University of Texas Medical Center, Houston, TX, May 16, 2009. Invited speaker.
463. "Ligand Targeted Delivery of siRNAs and other Therapeutic Molecules to Pathologic Cells and Tissues." TIDES 2009: Oligonucleotides and Peptide Technology and Product Development Conference, Las Vegas, NV, May 17-20, 2009. Invited speaker.

464. "Receptor-Targeted Therapeutic and Imaging Agents for Cancer and Inflammatory Diseases." University of Puerto Rico, Humacao, Puerto Rico, May 22-23, 2009. Invited speaker.
465. "Delivery of 'Oligonucleotides' and Other Therapeutic Agents Using Receptor-Targeted Ligands." Ambion Inc., Chicago IL, July 26, 2009. Invited speaker.
466. "Characterization of a new bridge between band 3 and the junctional complex." 2009 Red Cell Gordon Research Conference, University of New England, Biddeford, ME, June 28-July 3, 2009. Invited speaker.
467. "Receptor-Targeted Therapeutic and Imaging Agents for Cancer and Inflammatory Diseases." University of Notre Dame, Notre Dame, IN, July 7, 2009. Invited speaker.
468. "Folate receptor-targeted drug delivery for cancer and inflammatory diseases." "Membrane Transporters and Their Impact on Drug Discovery", Thun, Switzerland, August 9-12, 2009. Invited speaker.
469. "Quantitation and analysis of circulating tumor cells." GenProbe Inc., San Diego, CA, August 28, 2009. Invited speaker.
470. "Ligand-targeted imaging agents for cancer and inflammation." University of Groningen, The Netherlands, September 6-9, 2009. Invited Speaker.
471. "Targeted therapies for cancer and inflammation." Cincinnati Woman's Club, Cincinnati, OH, September 10, 2009. Invited Speaker.
472. "Circulating Tumor Cells (CTCs): Emerging Technologies for Detection, Diagnosis and Treatment." Bethesda, MD, September 10-11, 2009. Invited Speaker.
473. "Accurate Quantitation of Circulating Tumor Cells with Low Molecular Weight Tumor-Targeted Fluorescent Dyes." Cambridge Healthtech Institute's ADAPT 2009 Circulating Tumor Cells Conference, Washington, DC, September 24-25, 2009. Invited Speaker.
474. "Receptor-Targeted Therapeutic and Imaging Agents for Cancer and Inflammatory Diseases." The 3rd ICB&DD Annual Symposium on "Frontiers in Chemical Biology and Drug Discovery", Stony Brook, NY, October 6, 2009. Invited speaker.
475. "Receptor-Targeted Therapeutic and Imaging Agents for Cancer and Inflammatory Diseases." Weldon School of Biomedical Engineering, Purdue University, West Lafayette, IN Oct. 14, 2009. Invited speaker.
476. "Receptor-Targeted Therapeutic and Imaging Agents for Cancer and Inflammatory Diseases." University of Texas Medical Center, Houston, TX, May 16, 2009. Invited speaker.
477. "Ligand-Targeted Therapeutic and Imaging Agents for Cancer and Inflammatory Diseases." Scripps Research Institute, San Diego, CA. Nov. 9, 2009. Invited speaker.
478. "Receptor-Targeted Therapeutic and Imaging Agents for Cancer and Inflammatory Diseases." 8th Annual Gene Therapy Symposium for Heart, Lung, and Blood Diseases, Sonoma, CA. November 18, 2009. Invited keynote speaker.
479. "Use of tumor-specific ligands to isolate and characterize circulating tumor cells." American Urological Association Foundation Annual Meeting, Baltimore, MD, December 6, 2009. Invited speaker.
480. "Design and testing of folate-targeted phenanthroquinones for induction of oxidative damage to cancer cells and activated macrophages." University of Puerto Rico, Humacao, Puerto Rico, January 15 – 19, 2010. Invited speaker.
481. "Ligand targeted imaging and therapeutic agents for cancer and inflammatory diseases." University of Utah, January 30 to February 2, 2010. Invited speaker.

482. "Ligand targeted imaging and therapeutic agents for cancer and inflammatory diseases." Purdue Cancer Center Fund Raiser, Naples, FL, February 12, 2010. Invited Speaker.
483. "Ligand Targeted Imaging and Therapeutic Agents for Cancer and Inflammatory Diseases." Mayo Clinic, Rochester MN, March 11, 2010. Invited Speaker.
484. "Serendipity in Science: The Circuitous Path to Discovery of New Potential Therapies for Cancer, Inflammatory and Infectious Diseases." Wabash College, Heines Lecture, Crawfordsville, IN, March 30, 2010. Invited Speaker.
485. "Use of Homing ligands to Delivery Attached Drugs to Pathologic Cells." Wabash College, Crawfordsville, IN, March 30, 2010. Invited Speaker.
486. "Ligand Targeted Imaging and Therapeutic Agents for Cancer and Inflammatory Diseases." VU Hospital, The Netherlands, April 6, 2010. Invited Speaker.
487. "Ligand targeted imaging and therapeutic agents for cancer and inflammatory diseases." 11th European Symposium on Controlled Drug Delivery, Egmond aan Zee, The Netherlands, April 7, 2010. Keynote Invited Speaker.
488. "Ligand targeted imaging and therapeutic agents for cancer and inflammatory diseases." Society on NeuroImmune Pharmacology (SNIP), Manhattan Beach, CA, April 15, 2010. Invited Speaker.
489. "Ligand targeted imaging and therapeutic agents for cancer and inflammatory diseases." Morphotek Inc., New Jersey, April 27, 2010. Invited Speaker.
490. "Ligand targeted imaging and therapeutic agents for cancer and inflammatory diseases." University of Washington, Seattle WA, May 4, 2010. Invited Speaker.
491. "Ligand targeted imaging and therapeutic agents for cancer and inflammatory diseases." Amgen Inc., Seattle, WA, May 5, 2010. Invited Speaker.
492. "Receptor-Targeted Therapeutic and Imaging Agents for Cancer." Membranes and Cancer Biology Symposium, Purdue University, West Lafayette, IN, May 6 - 8, 2010. Invited Speaker.
493. "Ligand targeted imaging and therapeutic agents for cancer and inflammatory diseases." Indiana University Life Sciences Conference: Personalized Medicine Conference, Indianapolis, IN, May 14, 2010. Invited Speaker.
494. "Ligand targeted therapeutic and imaging agents for cancer and inflammation." 5th Nanobiology Think Tank, NIH Bethesda MD, June 3, 2010. Invited Speaker.
495. "Characterization of red cell membrane properties by analysis of band 3 and GLUT1 diffusion." Red Cell 2010, Rome, Italy, June 4 – 6, 2010. Invited Speaker.
496. "Immutable Ligands and Rapid Pathogen Capture and Identification." Centers for Disease Control (Plenary Lecture; Annual Science Summit), Atlanta, GA, Aug 24, 2010.
497. "Imaging Diseased Tissues in People and Animals with Optical and Radioimaging Agents." Purdue University, Bindley Imaging Symposium, September 8, 2010. Invited Speaker.
498. "Adducin in the Architecture of the Red Cell Membrane." International Conference on the Role of blood group antigens and associated molecules in red cell biology: from molecular approach to clinical applications, Paris, France, September 14 – 17, 2010. Invited Speaker.
499. "Ligand targeted Therapeutic and Imaging Agents for Cancer and Inflammation." IU Medical Center, Indianapolis, IN, September 20, 2010. Invited Speaker.

500. "Targeted Therapeutic and Imaging Agents for Cancer, Autoimmune and Inflammatory Diseases." Yale University Pathology Grand Rounds Series, New Haven, CT, September 23, 2010. Invited Plenary Speaker.
501. "Folate Receptor Expressing Macrophages: Critical Targets for Therapy and Imaging of Inflammatory and Autoimmune Diseases." 16th Annual Inflammation Research Association Conference, Chantilly, VA, September 28 – 29, 2010. Invited Speaker.
502. "Ligand targeted Therapeutic and Imaging Agents for Cancer and Inflammation." 8th International Nanomedicine and Drug Delivery Symposium (NanoDDS'10), Omaha, NB, October 3 – 5, 2010. Invited Speaker.
503. "Ligand targeted Therapeutic and Imaging Agents for Cancer." 2nd International Nanotechnology Conference and Exhibition (NanoIsrael 2010), November 8 – 9 2010. Invited Speaker.
504. "Detection and isolation of circulating tumor cells using receptor-targeted fluorescent dyes." World CTC Summit, Boston, MA, November 30, 2010. Invited Speaker.
505. "Targeted Therapeutics and Associate Safety Issues." Food and Drug Administration, White Oaks, MD, December 6, 2010. Invited Speaker.
506. "Ligand targeted Therapeutic and Imaging Agents for Cancer and Inflammation." Purdue University ACS Student Affiliate, December 12, 2010. Invited Speaker.
507. "Detection and isolation of circulating tumor cells using receptor-targeted fluorescent dyes." University of Puerto Rico, Humacao, Puerto Rico, January 11 – 15, 2011. Invited Speaker.
508. "Ligand targeted Therapeutic and Imaging Agents for Cancer and Inflammation." Asian Medical Center Symposium on Nanotherapeutics, Seoul, Korea, February 24 – 25, 2011. Invited Speaker.
509. "Ligand targeted Therapeutic and Imaging Agents for Cancer." Mayo Clinic, Dept. of Hematology and Oncology, Rochester, NY, March 3, 2011. Invited Speaker.
510. "Structure of the human erythrocyte membrane." University of British Columbia, Vancouver, BC, March 30, 2011. Invited Speaker.
511. "Ligand targeted Therapeutic and Imaging Agents for Cancer." Liposomes in Jerusalem 2011 Conference, Jerusalem, Israel, May 15 – 19, 2011. Invited Speaker.
512. "Ligand targeted Therapeutic and Imaging Agents for Cancer." Pancreatic Cancer Working Group Meeting, IUPUI, June 15, 2011. Invited Speaker.
513. "Folate receptor recycling and receptor-mediated drug delivery" FASEB Summer Conference on "Protein Lipidation, Signaling, and Membrane Domains.", Saxton River VT, August, July 26 – 27, 2011. Invited Speaker.
514. "Drug Targeting to Lung Cancer and Asthma." Lung Development, Injury and Repair Gordon Research Conference, Newport, Rhode Island, August 15 -19, 2011. Invited Speaker.
515. "Ligand-Targeted Therapeutic and Imaging Agents for Cancer and Inflammatory Diseases." University of Maryland College Park, College Park, Maryland, September 9, 2011. Invited Speaker.
516. "Ligand-Targeted Therapeutic and Imaging Agents for Cancer." University of Cincinnati, Cincinnati, Ohio, September 12, 2011. Invited Speaker.
517. "Rapid and Accurate Pathogen Detection and Identification." Defense Threat Reduction Agency, Fort Belvoir, VA 22060, October 4, 2011. Invited Speaker.

518. "Ligand-Targeted Therapies for Cancer and Inflammatory diseases." EACR Anticancer Drugs Research, Antalya, Turkey, October 12 – 16, 2011. Invited Speaker.
519. "Design of Ligand-Targeted Imaging and Therapeutic Agents for Cancer and Inflammatory Diseases." 5th Drug Design and Medicinal Chemistry Conference, San Diego, California, October 19 – 21, 2011. Invited Speaker.
520. "Ligand-Targeted Therapies and Imaging Agents for Cancer and Inflammation." Albert Einstein College of Medicine, New York, New York, November 7, 2011. Invited Speaker.
521. "Targeted Delivery of Therapeutics/ Imaging Contrast Agents – Nanotechnology-Based." American Society for Nano Medicine Annual Meeting, Gaithersburg, Maryland, November 9 – 11, 2011. Invited Speaker.
522. "Receptor-targeted therapeutic and imaging agents for cancer and inflammatory diseases." University of Pennsylvania Center for Research on Reproduction and Women's Health, December 14, 2011. Invited Speaker.
523. "Fluorescence-Guided Surgery." Lafayette Medical Education Foundation, Inc., January 20, 2012. Invited Speaker
524. "Ligand-Targeted Therapeutic and Imaging Agents for Cancer and Inflammatory Diseases" Virginia Polytechnic Institute and State University, January 27, 2012. Invited Speaker.
525. "The Fortuitous and Rocky Path to Commercialization of Ligand-Targeted Drugs" 1st Source Bank Commercialization Award Dinner, Notre Dame and Indiana University School of Medicine-South Bend, March 1, 2012. Invited Keynote Speaker.
526. "Illuminate Innovation" TEDxPurdueU 2012, Purdue University, March 21, 2012. Invited Speaker.
527. University of Iowa, April 10, 2012. Invited Speaker
528. "Ligand-Targeted NanoMedicines: From Bench top to Clinic" Nanotechnology Meeting 5th European Conference for Clinical Nanomedicine (CLINAM 2012), Basel, Switzerland, May 6-11, 2012. Invited Speaker.
529. "Protein Lipidation, Signaling, and Membrane Domains." Drug Carriers in Medicine & Biology, Waterville Valley, VT, August, 12 – 17, 2012. Invited Speaker.
530. "Drug Targeting to Lung Cancer and Asthma." Lung Development, Injury and Repair Gordon Research Conference, Newport, Rhode Island, August 14 -19, 2012. Invited Speaker.
531. "Targeted Therapeutics and Imaging agents in Modern Medicine" The Midwest Oncology Nursing Symposium, Purdue University, September 11, 2012. Invited Speaker.
532. "Use of Folate Tags for Imaging and Therapy of Women's Diseases" Women's Global Health Initiative at Purdue, Purdue University, September 28, 2012. Invited Speaker.
533. "Biology and expression of folate receptor beta" The Fourth International Symposium on folate Receptors and Transporters, Cozumel, Mexico, October 7 -11, 2012.
534. "Ligand-targeted therapeutic and imaging agents" Symposium on Targeted Therapeutics and Translational Nanomedicine, University of Pennsylvania, November 27, 2012, Invited Speaker.
535. "Ligand-targeted imaging and therapeutic agents for cancer and inflammatory diseases" MD Anderson Cancer Center, The University of Texas, February 6, 2013. Invited Speaker.
536. 2013 NanoART External Advisory Committee, Rockville, MD, February 6-7, 2013.

537. "Ligand-Targeted Imaging and Therapeutic Agents for Cancer and Inflammatory Diseases" Case Comprehensive Cancer Center at University Hospitals and Case Western Reserve University, Cleveland, Ohio, February 15, 2013. Invited Speaker.
538. "The exciting direction of drug discovery at Purdue University" President's Council Dinner, Naples, Florida. February 16, 2013. Invited Speaker.
539. "Ligand-targeted imaging and therapeutic agents for cancer and inflammatory diseases" Karmanos Cancer Center, Detroit, Michigan, February 26, 2013. Invited Speaker.
540. "Ligand targeting of nanomedicines to cancer cells and sites of inflammation" 2013 Nanomedicines Alliance Industry Symposium, Rockville, MD, March 6, 2013. Invited Speaker.
541. "Ligand-targeted imaging and therapeutic agents for cancer and inflammatory diseases" University of Hue, Vietnam, March 13, 2013. Invited Speaker.
542. The Unintended Consequences Of Pink: Reorienting the Cause April 15, 2013. Invited Speaker.
543. "Ligand-Targeted Therapies for Cancer, Inflammatory and Infectious Diseases" 2013 International Advanced Drug Delivery Symposium, Taipei, Taiwan, May 1-4, 2013. Invited Speaker
544. "Principles of Ligand-Targeted Drug Design" 12th Annual World Pharma Congress, Philadelphia, PA, June 4-5, 2013. Invited Speaker
545. Future Directions and Opportunities for Cancer Nanotechnology, NIH Campus, June 5-6, 2013. Invited Speaker
546. Prostate Cancer Section presentation at the Indiana Cancer Consortium in Indianapolis, IN, June 12, 2013. Invited Speaker
547. "Novel Targeting Ligands for Imaging and Therapy of Cancer" Frontiers in Medicinal Chemistry Symposium, San Francisco, CA, June 23-25, 2-13. Invited Speaker
548. Bioconjugates: From Targets to Therapeutics-IBC Conference, June 26-27, 2013. Invited Speaker.
549. "Regulation of erythrocyte function by oxygen and tyrosine kinases" Red Cell Gordon Conference, Andover, New Hampshire, July 2013. Invited Speaker.
550. "Ligand-targeted Therapeutic and Imaging Agents for Cancer and Inflammation" MSKCC, New York, NY, August 2013. Invited Speaker
551. "Tumor-Targeted NIR Dyes for Fluorescence-Guided Surgery" World Molecular Imaging Society. Savannah, GA, September 17-22, 2013. Invited Speaker
552. "Novel Targeted Therapeutic and Imaging Agents for Cancer and Inflammatory Diseases" Brigham Young University, Provo, UT, October 11, 2013. Invited Speaker
553. "Novel Targeted Therapeutic and Imaging Agents for Cancer and Inflammatory Diseases" Houston Methodist Research Institute, Dallas, TX, December 3, 2013. Invited Speaker
554. Keynote address at inaugural meeting of Indian Society of Chemical Biology. Hyderabad, Indian, February 29, 2014. Invited Speaker
555. "Fluorescence-guided surgery for cancers using tumor-targeted fluorescent dyes" The International Study Group of Fluorescence Imaging in Surgery, Coral Gables, FL, February 15, 2014. Invited Speaker
556. "Tumor-Targeted Fluorescent Dyes for Fluorescence-Guided Surgery" Pittcon, Cancer Nanotechnology – Enabling Development of New Diagnostics and Therapeutics, Chicago, IL, March 3, 2014. Invited Speaker

557. “Ligand targeted imaging and therapeutic agents for cancer” Eli Lilly, Indianapolis, IN March 28, 2014. Invited Speaker
558. “Ligand targeted imaging and therapeutic agents for cancer” Eli Lilly, Indianapolis, IN March 28, 2014. Invited Speaker
559. “Ligand targeted imaging and therapeutic agents for cancer” University of Minnesota, April 22, 2014. Invited Speaker
560. “Ligand-targeted therapeutic and imaging agents for cancer, autoimmune and infectious diseases” Leibniz-Wirkstofftage 2013, Berlin, Germany, April 29, 2014. Invited Speaker
561. “Ligand-targeted imaging and therapeutic agents for cancer” Leibniz-Institut für Molekulare Pharmakologie (FMP), Verona, Italy, May 5, 2014. Invited Speaker
562. “New therapy for malaria based on its mechanism of escape from human erythrocytes” Leibniz-Institut für Molekulare Pharmakologie (FMP), Verona, Italy, May 6, 2014. Invited Speaker
563. “Ligand-targeted imaging conjugates for cancer, autoimmune and infectious diseases” IBC Conference, San Francisco, CA, June 6, 2014. Invited Speaker and Session Chair.
564. “Drug Carriers – Transforming Medicine Now and in the Future” GRC on Drug Carriers in Biology and Medicine, Waterville Valley, New Hampshire, August 17-19, 2014. Session Leader.
565. "Regulation of Ankyrin-Band 3 Interactions in Healthy and Malaria-Infected Cells" Red Cell Club Meeting, Toronto, Canada, September 19-20, 2014. Invited Speaker.
566. “Novel Folate Receptor-Targeted Immunotherapies for Cancer” Fourth International Folate Receptor Society Meeting, Heemskerk, Netherlands, September 27 – October 5, 2014. President, Lead Speaker.
567. “Ligand-targeted drugs for cancer, autoimmune and infectious diseases” IUB-based Watanabe Symposium, Bloomington, IN, October 11, 2014. Invited Speaker.
568. “Ligand-targeted drugs for cancer, autoimmune and infectious diseases” Busitema University, Mbale, Uganda, October 14, 2014. Invited Speaker.
569. “Ligand-targeted drugs for cancer, autoimmune and infectious diseases” University of Toronto, Toronto, Canada, December 10, 2014. Invited Speaker.
570. “Ligand-targeted drugs for cancer, autoimmune and infectious diseases” 7th international symposium on drug discovery at Zydus Research Center, Ahmedabad, India, February 2-4, 2015. Invited Speaker.
571. “Ligand-Targeted Imaging and Therapeutic Agents for Cancer, Autoimmune and Infectious Diseases” UT Southwestern Medical Center, Dallas, Texas, February 19, 2015. Invited Speaker.
572. “Design, Development and Clinical Evaluation of Ligand-Targeted Cancer Therapies” Garnet E. Peck Symposium, West Lafayette, Indiana, February 27, 2015. Invited Speaker.
573. “Ligand-targeted drugs for cancer, autoimmune and infectious diseases” Universidad Metropolitana, Puerto Rico, March 2-3, 2015. Invited Speaker.
574. “Design and development of ligand-targeted therapies and imaging agents for multiple human diseases” ACS, Denver, Colorado, March 23-26. Invited Speaker and Awardee.
575. “Ligand-targeted imaging and therapeutic agents for cancer, autoimmune and infectious diseases.” Wayne State University, Detroit, Michigan, April 8, 2015. Invited Speaker and Awardee.

576. “Ligand-targeted imaging and therapeutic agents for cancer, autoimmune and infectious diseases” and “Structure and function of the erythrocyte membrane: Novel therapies for malaria, thalassemias and sickle cell disease will be in Physics” King Saad University, Riyadh, Saudi Arabia, April 12-14, 2015. Invited Speaker.
577. "Characterization of a tyrosine kinase signaling pathway in erythrocytes and its role in development of a new therapy for malaria" European Red Cell Club, Roscoff, France, April 17-20, 2015. Invited Speaker
578. “Ligand-Targeted Imaging and Therapeutic Agents for Cancer” AACR Annual Meeting, Philadelphia, Pennsylvania, April 20-22, 2015. Invited Speaker and Awardee.
579. “Oxygen Regulation of the Hoffman ATP Pool, and other RBC Membrane Properties" Yale, Boston, Massachusetts, April 28-29, 2015, Invited Speaker.
580. “Ligand-targeted imaging and therapeutic agents for cancer, autoimmune and infectious diseases” National Veterinary Meeting, Indianapolis, Indiana, June 3-4, 2015. Invited Speaker.
581. “Regulation of ankyrin-Band 3 interactions in healthy and diseased red cells” Red Cell Gordon Conference, Holderness, New Hampshire, June 28-July 3,2015. Invited Speaker.
582. “Ligand-targeted imaging agents for cancer, autoimmune and infectious diseases” World Molecular Imaging Conference, Honolulu, Hawaii, Sept. 2-5, 2015. Invited Speaker.
583. “Ligand-targeted imaging and therapeutic agents for cancer, autoimmune and infectious diseases” Novartis, Basel, Switzerland, September 23-27, 2015. Invited Speaker.
584. “Ligand-targeted imaging and therapeutic agents for cancer, autoimmune and infectious diseases” Google, San Francisco, California, October 5-7, 2015. Invited Speaker.
585. “Ligand-targeted imaging and therapeutic agents for cancer, autoimmune and infectious diseases” University of Maryland, Baltimore, MD, October 13, 2015. Invited Speaker.
586. “Development of a new mutation-resistant therapy for malaria” National Institute of Health, Bethesda, Maryland, October 14, 2015. Invited to update the NIH on current malaria research.
587. “Carrying a drug to its target: bonding or pocketing” AAPS National Meeting, Orlando, Florida, October 28, 2015. Invited Speaker.
588. “Ligand-targeted therapeutic and imaging agents for cancer” Johnson & Johnson, New Brunswick, New Jersey, November 3, 2015. Invited Speaker.
589. “Ligand-targeted therapeutic and imaging agents for cancer, autoimmune, and infectious diseases” Mertes Lecture, University of Kansas, Lawrence, Kansas, November 5, 2015. Invited Speaker.
590. “Fluorescence-guided surgery of prostate, brain, lung, and ovarian cancers: Recent clinical and preclinical data” Indiana University, Department of Urology Genitourinary Conference, January 6, 2016. Invited Speaker.
591. “Fluorescence guided surgery of ovarian, brain, and lung cancers using OTL38, a new tumor-targeted NIR dye” 3rd Annual International Congress of Fluorescent Guided Imaging Surgery, Coral Gables, Florida, February 6-7, 2016. Invited Speaker.
592. “Blazing new Frontiers in Drug Discovery at Purdue“ President’s Council Weekend in Naples, Florida February 12-14, 2016. Invited Speaker.
593. “Ligand-targeted therapeutic and imaging agents for cancer, autoimmune, and infectious diseases” ACS National Meeting, San Diego, California, March 13-16, 2016. Invited Speaker.

594. "Ligand-targeted therapeutic and imaging agents for cancer, autoimmune, and infectious diseases" Novartis, San Diego, California, March 14, 2016 Invited Speaker.
595. "Purdue's cures for today's pressing diseases" WALLA Group, West Lafayette, Indiana, April 11, 2016. Invited Speaker
596. "Ligand-Targeted Therapeutic and Imaging Agents for Multiple Human Diseases" Flexner Discovery Lecture, Vanderbilt University, Nashville, Tennessee, April 15, 2016. Invited Speaker.
597. "Small ligand-targeted drug conjugates: An alternative to ADCs" Antibody-Drug Conjugates Meeting at PEGS, Boston, Massachusetts, April 25-27, 2016. Invited Speaker and Moderator.
598. "Fluorescence-guided surgery of prostate, brain, lung, and ovarian cancers: Recent clinical and preclinical data" University of Pennsylvania, Philadelphia, PA, May 18, 2016. Invited Speaker.
599. "Ligand-targeted therapeutic and imaging agents for multiple human diseases" EFMC International Symposium on Medicinal Chemistry, Manchester, England, August 28, 2016. Invited Speaker.
600. "Factors governing the rate and extent of accumulation of targeted drug accumulation in diseased tissues" World Molecular Imaging Conference, New York, NY, September 7, 2016. Invited Speaker.
601. "Ligand-Targeted Imaging and Therapeutic Agents for Multiple Human Diseases" ICRS Meeting, Ma'alot, Israel, September 14, 2016. Invited Speaker.
602. "Use of Folate to Target CAR T Cells and Fluorescent Dyes to Solid Tumors" Folate Receptor Meeting, Breckenridge, CO, September 22, 2016. Invited Speaker and President, Folate Receptor Society.
603. "Mechanism of Regulation of Erythrocyte Pathways by O2" Red Cell Club Meeting, Long Island, NY, October 14, 2016. Invited Speaker.
604. "Design and Evaluation of New Drugs to Diagnose and Treat Important Human Diseases" Brigham Young University-Idaho, Rexburg, ID, October 20, 2016. Invited Speaker.
605. "Ligand-Targeted Imaging and Therapeutic Agents for Multiple Human Diseases" University of Illinois, Champagne Urbana, IL, November 18, 2016. Invited Speaker.
606. Ligand-Targeted Imaging and Therapeutic Agents for Multiple Human Diseases" Novartis Institute for Functional Genomics, San Diego, CA, April 27, 2017. Invited Speaker.
607. "Considerations in Starting a Drug Company: What I've Learned from Founding Four" University of Michigan, Ann Arbor, MI, May 10, 2017. Invited Speaker.
608. "Ligand-Targeted Imaging and Therapeutic Agents for Multiple Human Diseases" Royal Society of Chemistry, London, May 15, 2017. Invited Speaker.
609. "Ligand-Targeted Imaging and Therapeutic Agents for Cancer, Autoimmune and Infectious Diseases" University of California Irvine, Irvine, CA, May 25, 2017. Invited Speaker.
610. "Ligand-Targeted Imaging and Therapeutic Agents for Multiple Human Diseases" Rotary Club of Lafayette IN, June 8, 2017. Invited Speaker.
611. "Membrane Structure and Function" Discussion Leader at the Gordon Research Conference – Red Cells, Newport, RI, July 16, 2017. Invited Speaker.

612. "Principles in the Design of Ligand-Targeted Drugs: Examples from Drugs that Treat the Tumor Microenvironment" Medicinal Chemistry Gordon Conference, Colby-Sawyer Academy in New London, NH, August 9, 2017. Invited Speaker.
613. "A New General Mechanism of Kinase Regulation of Membrane Transporters: Novel Opportunities for Therapeutic Interventions" Inhibitors of Protein Kinases Meeting, Warsaw, Poland. September 19, 2017. Invited Speaker.
614. "Ligand-targeted imaging agents for cancer, autoimmune and infectious disease" Karmanos Cancer Institute, Detroit, MI. October 16, 2017. Invited Speaker.
615. "A New General Mechanism of Kinase Regulation of Membrane Transporters: Role of a Novel MESH Domain in Band 3 in Control of RBC Properties" Red Cell Club Meeting, Cincinnati, Ohio. October 27, 2017. Invited Speaker.
616. "Targeted imaging and therapeutic agents for cancer, autoimmune and inflammatory diseases" III International Conference on Clinical Sciences and Drug Discovery, Washington, DC. November 9, 2017. Invited Speaker.
617. "A New General Mechanism of Regulation of Membrane Transporters and its Role in the Development of Therapies for Malaria, Sickle Cell Disease, Depression, Anxiety, and Other Disorders" Center for Biosciences and Biomedical Engineering at IIT Indore. January 6, 2018. Invited Speaker.
618. "A New General Mechanism of Regulation of Membrane Transporters and its Role in the Development of Therapies for Malaria, Sickle Cell Disease, Depression, Anxiety, and Other Disorders" Plenary Speaker in eBBT2018 at IIT Indore, India. Chennai, January 9, 2018; Bangalore, January 10, 2018; Mumbai, January 11, 2018. Invited Speaker.
619. "Development of a new mutation-resistant therapy for malaria" Zambia. January 15, 2018. Invited Speaker.
620. "Tumor-targeted fluorescent dyes for fluorescence-guided surgery" Image-Guided Surgery Conference – SPIE Photonics West BIOS 2018. January 27, 2018. Invited Speaker.
621. "New Generation of Smart Medicines that Accumulate Primarily in Diseased Cells" Francis Miller Endowed Lecture in Cancer at South Dakota State University. April 2, 2018. Invited Speaker.
622. "Tumor Targeted Fluorescent Dyes" Academy Colloquium Precision surgery by tumor targeted molecular imaging. Amsterdam. April 16, 2018. Invited Speaker.
623. "Ligand-targeted imaging and Therapeutic Agents for Cancer, Autoimmune and Infectious Diseases" Northwestern, Center for Molecular Innovation and Drug Discovery. Chicago, IL. May 8, 2018. Invited Speaker.
624. "Ligand Targeted Drug Delivery" Ohio Valley Toxicology. West Lafayette, IN. May 18, 2018. Invited Speaker.
625. "Development of New Therapies for Cancer, Autoimmune and Infectious Diseases" Seniors Program, Purdue University. West Lafayette, IN. June 12, 2018. Invited Speaker.
626. "Ligand-targeted drugs for imaging and therapy of cancer, autoimmune and infectious diseases", St. Petersburg State University, St. Petersburg, Russia. August 16, 2018. Invited Speaker
626. "Ligand-targeted drugs for imaging and therapy of cancer", Institute for Oncology, St. Petersburg, Russia. August 17, 2018. Invited Speaker
627. "Ligand-targeted imaging agents for cancer, autoimmune and infectious diseases", BioCity Symposium. Turku, Finland. August 23, 2018. Invited Speaker.

628. “Ligand-targeted drugs for imaging and therapy of cancer, autoimmune and infectious diseases”, Ohio State University, Columbus, Ohio. September 4, 2018. Invited Speaker.
629. “Targeted Medicines for Cancer, Autoimmune and Infectious Diseases: Better Efficacy with Less Toxicity”, 150 Years of Giant Leaps Campaign for Purdue University. September 9, 2018. Invited Speaker.
630. “Folate-targeted CAR T cell therapies for cancer”, Folate Receptor Society. Sicily, Italy. October 3, 2018 Invited Speaker
631. “The structure and function of a novel SH2 domain in Band 3 and its role in multiple diseases”, Red Cell Club Meeting, Yale University. October 27, 2018. Invited Speaker.
632. “Ligand-Targeted Imaging and Therapeutic Agents for Multiple Human Diseases” Speiser Award, Zurich. October 30, 2018.
633. “Ligand-targeted imaging agents for cancer, autoimmune and infectious diseases”, WMIC, Philadelphia, PA. November 2, 2018. Invited Speaker.
634. "New Tumor-Targeted NIR Dyes for Fluorescence-Guided Surgery" (FGS) Fluorescence Guided Surgery Symposium, Fort Lauderdale, Fl. February 16, 2019. Invited Speaker.
635. “Evaluation of a Universal CAR T Cell Technology in Murine Tumor Models”, Keystone Symposium on Molecular and Cellular Biology, Whistler, Canada. March 10 – 14, 2019. Invited Speaker.
636. “Ligand-targeted imaging agents for cancer, autoimmune and infectious diseases”, “Journée Roger Monier” Cancer Imaging Conference, Paris, France. April 5-8, 2019. Invited Speaker.

## ACTIVE PATENTS AND PATENT APPLICATIONS

| Title | Patent Number or Application Number | Inventors | Filing Date | Issue Date |
|---|---|---|---|---|
| METHOD FOR ENHANCED TRANSMEMBRANE TRANSPORT OF EXOGENOUS MOLECULES | 5,108,921 | HEINSTEIN, PETER F.<br>LOW, PHILIP S.<br>HORN, MARK A. | Mar. 28, 1990 | Apr. 28, 1992 |
| METHOD FOR ENHANCING TRANSMEMBRANE TRANSPORT OF EXOGENOUS MOLECULES | 5,416,016 | HEINSTEIN, PETER F.<br>LOW, PHILIP S.<br>HORN, MARK A. | Mar. 13, 1992 | May 16, 1995 |
| METHOD FOR ENHANCED TRANSMEMBRANE TRANSPORT OF EXOGENOUS MOLECULES | 5,635,382 | HEINSTEIN, PETER F.<br>LOW, PHILIP S.<br>HORN, MARK A. | Dec. 5, 1994 | Jun. 3, 1997 |
| COMPOSITION AND METHOD FOR TUMOR IMAGING | 5,688,488 | HEINSTEIN, PETER F.<br>HORN, MARK A.<br>LOW, PHILIP S. | May 16, 1995 | Nov. 18, 1997 |
| METHOD FOR TARGETING A DIAGNOSTIC AGENT TO CELLS | 5,820,847 | HEINSTEIN, PETER F.<br>HORN, MARK A.<br>LOW, PHILIP S. | Jan. 15, 1997 | Oct. 13, 1998 |
| METHOD OF TREATMENT USING LIGAND-IMMUNOGEN CONJUGATES | 7,033,594 | LOW, PHILIP S.<br>LU, YINGIUAN | Mar. 30, 2001 | Apr. 25, 2006 |
| TREATMENT AND DIAGNOSIS OF MACROPHAGE MEDIATED DISEASE | 7,740,854 | LOW, PHILIP S.<br>TURK, MARY J. | May 2, 2002 | June 22, 2010 |
| FOLATE TARGETED ENHANCED TUMOR AND FOLATE RECEPTOR POSITIVE TISSUE OPTICAL IMAGING TECHNOLOGY | 8,043,602 | JALLAD, KARIM N.<br>KENNEDY, MICHAEL D.<br>LOW, PHILIP S.<br>BEN-AMOTZ, DOR | Feb. 6, 2003 | Oct. 25 2011 |

| **Title** | **Patent Number or Application Number** | **Inventors** | **Filing Date** | **Issue Date** |
|---|---|---|---|---|
| FOLATE TARGETED ENHANCED TUMOR AND FOLATE RECEPTOR POSITIVE TISSUE OPTICAL IMAGING TECHNOLOGY | 8,043,603 | JALLAD, KARIM N.<br>KENNEDY, MICHAEL D.<br>LOW, PHILIP S. | Dec. 19, 2003 | Oct. 25, 2011 |
| DIAGNOSTIC METHOD FOR ATHEROSCLEROSIS | 7,977,058 | LOW, PHILIP S. | Dec. 23, 2004 | Jul. 12, 2011 |
| METHOD OF TREATMENT USING LIGAND-IMMUNOGEN CONJUGATES | 8,105,608 | LOW, PHILIP S.<br>LU, YINGIUAN | Nov. 16, 2005 | Jan. 31 2012 |
| EX VIVO FLOW CYTOMETRY METHOD AND DEVICE | 8,685,752 | LOW, PHILIP S.<br>HE WEI<br>KULARATNE, SUMITH A. | Nov. 2, 2007 | Apr. 1, 2014 |
| POSITRON EMISSION TOMOGRAPHY IMAGING METHOD | 8,586,595 | LOW, PHILIP S.<br>KULARATNE, SUMITH K. | Feb. 7, 2008 | Nov. 19, 2013 |
| MULTIPHOTON IN VIVO FLOW CYTOMETRY METHOD AND DEVICE | 8,795,633 | LOW, PHILP S.<br>CHENG, JI-XIN<br>HE, WEI<br>HENNE, WALTER A.<br>DOORNEWEERD, DEREK D. | Mar. 21, 2008 | Aug. 5, 2014 |
| METHOD OF IMAGING LOCALIZED INFECTIONS | 8,961,926 | LOW, PHILIP S.<br>HENNE, WALTER A.<br>VARGHESE, BINDU<br>ROTHENBUHLER, RYAN | May. 23, 2008 | Feb. 24, 2015 |
| COMPOSITION AND METHOD FOR TREATING INFLAMMATORY DISEASE | 12/130,121 | LOW, PHILIP S.<br>KULARATNE, SUMITH A. | May 30, 2008 | |
| TARGETED CONJUGATES AND RADIATION | 8,168,164 | LOW, PHILIP S.<br>SEGA, EMANUELA I. | Jul. 30, 2008 | May 1, 2012 |

| **Title** | **Patent Number or Application Number** | **Inventors** | **Filing Date** | **Issue Date** |
|---|---|---|---|---|
| IMAGING AND THERAPEUTIC METHOD USING PROGENITOR CELLS | 12/301,864 | LOW, PHILIP S.<br>HILGENBRINK, ANDREW R. | Nov. 21, 2008 | |
| PSMA BINDING LIGAND-LINKER CONJUGATES AND METHODS FOR USING | 9,193,763 | LOW, PHILIP S.<br>KULARATNE, SUMITH A | Aug 15, 2008 | Nov, 24, 2015 |
| IMAGING AND THERAPEUTIC METHOD USING MONOCYTES | 12/391,981 | LOW, PHILIP S.<br>HILGENBRINK, ANDREW R. | Feb. 24, 2009 | |
| EARLY EC20 SIGNAL IN ApoE-/-MICE ON WESTERN DIET | 61/157,847<br>PRF65296 | AYALA-LOPEZ, WILFREDO LOW, PHILIP S. | Mar. 5, 2009 | |
| BINDING LIGAND LIKED DELIVERY CONJUGATES OF NUCLEOTIDES | 61/187,416<br>PRF65388 | LEAMON, CHRISTOPHER P.<br>VLAHOV, IONTCHO R.<br>KLEINDL, PAUL J.<br>LOW, PHILIP S.<br>THOMAS, MINI | June. 16, 2009 | |
| FOLATE RECEPTOR BINDING CONJUGATES OF ANTIFOLATES | 8,546,425 | LEAMON, CHRISTOPHER P.<br>VLAHOV, IONICHO R.<br>LOW, PHILIP S. | Sep. 17, 2009 | Oct. 1, 2013 |
| FOLATE TARGETING OF NUCLEOTIDES | PCT/US2009/061049 | LOW, PHILIP S.<br>LEAMON, CHRISTOPHER P.<br>VLAHOV, IONICHO R.<br>THOMAS, MINI<br>KLEINDL, PAUL J.<br>QI, LONGWU | Oct. 16, 2009 | |
| IVFLOW | 61/298,258<br>PRF65204 | CHENG, JI-XIN<br>HE, WEI<br>LOW, PHILIP S.<br>WANG, HAN-WEI | Jan. 1, 2010 | |

| **Title** | **Patent Number or Application Number** | **Inventors** | **Filing Date** | **Issue Date** |
|---|---|---|---|---|
| DETECTION OF ARTHRITIC LESIONS USING FOLATE LINKED CONJUGATES | 61/154,694<br>PRF65295 | LOW, PHILIP | Feb. 23, 2010 | |
| METHOD FOR EARLY IMAGING OF ATHEROSCLEROSIS | PCT/US2010/026406<br>13/254,637 | LOW, PHILIP S.<br>AYALA-LOPEZ, WILFREDO | Mar. 5, 2010 | |
| DELIVERY OF AGENTS TO INFLAMED TISSUES USING FOLATE-TARGETED LIPOSOMES | 61/349,434<br>PRF65614 | POH, SCOTT YEW TAT<br>LOW, PHILIP S. | May. 28, 2010 | |
| SELECTIVE CAPTURE AND IDENTIFICATION OF PATHOGENIC BACTIERA USING IMMOBILIZED SIDEROPHORE | 61/358,735<br>PRF65600 | DOORMEWEERD, DEREK<br>HENNE, WALTER<br>KIM, YOUNGSOON<br>KIM, YEONG<br>REIFENBERGER, RONALD<br>WEI, ALEXANDER<br>LOW, PHILIP S. | Jun. 25, 2010 | |
| DIAGNOSTIC METHOD FOR ATHEROSCLEROSIS | 8,383,354 | LOW, PHILIP S. | Apr. 8, 2011 | Feb. 26, 2013 |
| PATHOGEN DETECTION | 9,250,238 | LOW, PHILIP<br>WEI, ALEXANDER<br>LEONOV, ALEXEI P.<br>ADAK, AVIJIT KUMAR<br>LYVERS, DAVID P.<br>DOORNEWEERD, DEREK<br>DURUGKAR, KULBHUSHAN A.<br>BANDARI, RAJENDRA P.<br>PANDEY, RAJESH K.<br>REIFENBERGER, RONALD G.<br>HENNE, WALTER<br>KIM, YEONG E.<br>KIM, YOUNGSOON | Jun. 24, 2011 | Feb. 2, 2016 |

| **Title** | **Patent Number or Application Number** | **Inventors** | **Filing Date** | **Issue Date** |
|---|---|---|---|---|
| METHODS FOR TREATING CANCER | 61/605,678 PRF66099 | KNAPP, DEBORAH DHAWAN, DEEPIKA LOW, PHILIP S | Mar. 1, 2012 | |
| MICRO-FLUIDIC SYSTEM USING MICRO-APERTURES FOR HIGH THROUGHPUT DETECTION OF CELLS | 14/001,963 | LOW, PHILIP SAVRAN, CAGRI CHANG, CHUN-LI | Apr 5, 2012 | |
| DIAGNOSIS OF MACROPHAGE MEDIATED DISEASE | 8,388,977 | LOW, PHILIP S TURK, MARY JO | Jun. 21, 2012 | Mar. 5, 2013 |
| PSMA BINDING LIGAND-LINKER CONJUGATES AND METHODS FOR USING | 13/580,436 | LOW, PHILIP S CHELVAM, VENKATESH KIM, YOUNGSOON | Aug. 22, 2012 | |
| A VERSATILE PLATFORM BASED ON CELL PHONE TECHNOLOGY TO IMPLEMENT TELEDIAGNOSTIC PATTERN-RECOGNITION FOR RAPID IDENTIFICATION OF BACTERIAL AND VIRAL PATHOGENS | 61/711,683 | LOW, PHILIP REIFENBERGER, RONALD KIM, YEONG KULKARNI, GIRIDHOR U. LYVERS, DAVID P. GUPTA, RITU KIRACOFE, DANIEL R. WEI, ALEXANDER | Oct. 9, 2012 | |
| DELIVERY OF AGENTS TO INFLAMED TISSUES USING FOLATE-TARGETED AGENTS | 13/700,358 | LOW, PHILIP POH, SCOTT YEW TAT | Nov. 27, 2012 | |
| DIAGNOSTIC METHOD FOR ATHEROSCLEROSIS | 8,808,998 | LOW, PHILIP | Dec. 14, 2012 | Aug. 19, 2014 |
| ADOPTIVE CELL THERAPY USING CHIMERIC ANTIGEN RECEPTOR EXPRESSING T CELLS FOR THE TREATMENT OF CANCERS | 61/740,384 | LOW, PHILIP | Dec. 20, 2012 | |

| **Title** | **Patent Number or Application Number** | **Inventors** | **Filing Date** | **Issue Date** |
|---|---|---|---|---|
| FOLATE TARGETED ENHANCED TUMOR AND FOLATE RECEPTOR POSITIVE TISSUE OPTICAL IMAGING TECHNOLOGY | 8,858,914 | KENNEDY, MICHAEL D.<br>LOW, PHILIP S. | Dec. 21, 2012 | Oct. 14 2014 |
| FOLATE TARGETED ENHANCED TUMOR AND FOLATE RECEPTOR POSITIVE TISSUE OPTICAL IMAGING TECHNOLOGY | 8,865,128 | JALLAD, KARIM N.<br>KENNEDY, MICHAEL D.<br>LOW, PHILIP S.<br>BEN-AMOTZ, DOR | Dec. 21, 2012 | Oct. 21 2014 |
| CHOLECYSTOKININ B RECEPTOR TARGETING FOR IMAGING AND THERAPY | PCT/US2013/027463<br>14/380,273 | LOW, PHILIP<br>WAYUA, CHARITY | Feb. 22, 2013 | |
| METHODS FOR TREATING CANCER | 13/779,501 | DHAWAN, DEEPIKA<br>KLEINDL, PAUL JOSEPH<br>KNAPP, DEBORAH<br>LOW, PHILIP S<br>VLAHOV, IONTCHO RADOSLAVOV | Feb. 27, 2013 | |
| FOLATE RECEPTOR ALPHA BINDING LIGANDS | 14/382177 | LOW, PHILIP<br>VAITILINGAM, BALASUBRAMANIAN CHELVAM, VENKATESH | Feb. 28, 2013 | |
| ANTI-HUMAN FOLATE RECEPTOR BETA ANTIBODIES AND METHODS OF USE | 8,871,206 | LOW, PHILIP<br>DIMITROV, DIMITER S.<br>FENG, YANG<br>SHEN, JIAYIN | Mar 8, 2013 | Oct. 28, 2014 |
| TREATMENT AND DIAGNOSIS OF MACROPHAGE MEDIATED DISEASE | 8,916,167 | LOW, PHILIP S.<br>TURK, MARY JO | Mar. 12, 2013 | Dec. 23, 2014 |

| **Title** | **Patent Number or Application Number** | **Inventors** | **Filing Date** | **Issue Date** |
|---|---|---|---|---|
| PMSA BINDING LIGAND-LINKER CONJUGATES AND METHODS FOR USING | 8,907,058 | LOW, PHILIP S.<br>KULARATNE, SUMITH A. | Mar 14, 2013 | Dec. 9, 2014 |
| FOLATE RECEPTOR BINDING CONJUGATES OF ANTIFOLATES | 9,192,682 | LEAMON, CHRISTOPHER<br>VLAHOV, IONTCHO<br>LOW, PHILIP | Aug 26, 2013 | Nov. 24, 2015 |
| POSITRON EMISSION TOMOGRAPHY IMAGING METHOD | 9,180,215 | LOW, PHILIP S.<br>KULARATNE, SUMITH A. | Oct. 21, 2013 | Nov. 10, 2015 |
| DUPA-INDENOISOQUINOLINE CONJUGATES | 61/900,800<br>PRF 2013-CUSH-66410-01 | LOW, PHILIP<br>CUSHMAN, MARK<br>NGUYEN, TRUNG | Nov. 6, 2013 | |
| SYK INHIBITORS AS TREATMENT FOR MALARIA | 14/132533 | LOW, PHILIP<br>TURRINI, FRANCESCO<br>KESELY, KRISTINA | Dec. 18, 2013 | |
| METHODS OF IMAGING INFLAMMATORY DISEASES BY LIGANDS CONJUGATED TO FLUORESCENT COMPOUNDS | 9,233,175 | LOW, PHILIP S.<br>KULARATNE, SUMITH A.<br>KELDERHOUSE, LINDSAY E.<br>MAHALINGHAM, SAKKARAPALAYAM, M. | Dec 19, 2013 | Jan. 12, 2016 |
| FLUORESCENCE IMAGING OF INFLAMMATORY DISEASES | PCT/US2013/076659 | LOW, PHILIP<br>KULARATNE, SUMITH<br>KELDERHOUSE, LINDSAY | Dec 19, 2013 | |
| CHIMERIC ANTIGEN RECEPTOR-EXPRESSING T CELLS AS ANTI-CANCER THERAPEUTICS | PCT/US2013/076986<br>14/654227 | LOW, PHILIP<br>CHU, HAIYAN<br>LEE, YONG GU | Dec. 20, 2013 | |
| ASTHMA IMAGING | 14/206,904 | LOW, PHILIP<br>SHEN, JIAYIN | Mar. 12, 2014 | |
| ASTHMA IMAGING AND THERAPY | PCT/US2014/024617 | LOW, PHILIP<br>SHEN, JIAYIN | Mar. 12, 2014 | |

| **Title** | **Patent Number or Application Number** | **Inventors** | **Filing Date** | **Issue Date** |
|---|---|---|---|---|
| SYNTHESIS AND COMPOSITION OF AMINO ACID LINKING GROUPS CONJUGATED TO COMPOUNDS USED FOR THE TARGETED IMAGING OF TUMORS | 9,061,057 | KULARATNE, SUMITH<br>MAHALINGAM, SAKKARAPALAYAM<br>LOW, PHILIP | Mar. 12, 2014 | Jun. 23, 2015 |
| ANTI-HUMAN FOLATE RECEPTOR BETA ANTIBODIES AND METHODS OF USE | 14/524304 | LOW, PHILIP<br>DIMITROV, DIMITER S.<br>FENG, YANG<br>SHEN, JIAYIN | Oct. 27, 2014 | |
| COMPOUNDS FOR POSITRON EMISSION TOMOGRAPHY | 15/035936 | VLAHOV, IONTCHO R.<br>LEAMON, CHRISTOPHER P.<br>LOW, PHILIP S.<br>PARHAM, GARTH L.<br>CHEN, QINGSHOU | Nov. 13, 2014 | |
| PATIENT SELECTION METHOD FOR INFLAMMATION | PCT/US14/66347 | LOW, PHILIP<br>KELDERHOUSE, LINDSAY | Nov. 19, 2014 | |
| SYNTHESIS AND COMPOSITION OF AMINO ACID LINKING GROUPS CONJUGATED TO COMPOUNDS USED FOR THE TARGETED IMAGING OF TUMORS | 9,341,629 | KULARATNE, SUMITH<br>MAHALINGAM, SAKKARAPALAYAM<br>LOW, PHILIP | May 19, 2015 | May 17, 2016 |
| DESIGN AND DEVELOPMENT OF NEUROKININ-1 RECEPTOR-BINDING AGENT DELIVERY CONJUGATES | PCT/US2015/044229 | KANDULURU, ANANDA KUMAR<br>LOW, PHILIP | Jul. 8, 2015 | |
| FOLATE RECEPTOR BINDING CONJUGATES OF ANTIFOLATES | 9,549,992 | LEAMON, CHRISTOPHER<br>VLAHOV, IONTCHO<br>LOW, PHILIP | Oct. 21, 2015 | Jan. 24, 2017 |

| **Title** | **Patent Number or Application Number** | **Inventors** | **Filing Date** | **Issue Date** |
|---|---|---|---|---|
| METHOD OF TREATMENT USING FOLATE CONJUGATES AND TYROSINE KINASE INHIBITORS | 14/966530 | LOW, PHILIP BANDARA, NIMALAKA A. | Dec. 11, 2015 | |
| | | | | |
| PSMA BINDING LIGAND-LINKER CONJUGATES AND METHODS FOR USING | US-2016151508-A1 | PHILIP STEWART LOW, VENKATESH CHELVAM, YOUNGSOON KIM, SUMITH A. KULARATNE | 2/8/2016 | |
| ANTI-HUMAN FOLATE RECEPTOR BETA ANTIBODIES AND METHODS OF USE | US-2016207999-A1 | PHILIP S. LOW, DIMITER S. DIMITROV, YANG FENG, JIAYIN SHEN | 4/8/2016 | |
| METHODS FOR TREATING HEMOLYTIC DISEASES AND SICKLE CELL DISEASE | WO-2016168444-A1 | FRANCESCO TURRINI, ANTONELLA PANTALEO, PHILIP S. LOW | 4/14/2016 | |
| LIGAND IONOPHORE CONJUGATES | WO-2016183131-A1 | PHILIP STEWART LOW, VENKATESH CHELVAM | 5/11/2016 | |
| BONE FRACTURE REPAIR BY TARGETING OF AGENTS THAT PROMOTE BONE HEALING | WO-2016196400-A1 | JINDRICH KOPECEK, JIYAN YANG, STEWART ANDREW LOW, PHILIP S. LOW, CHRISTOPHER GALLIFORD | 5/29/2016 | |
| CORRELATING BRAIN SIGNAL TO INTENTIONAL AND UNINTENTIONAL CHANGES IN BRAIN STATE | US-9820663-B2 | PHILIP STEVEN LOW | 6/13/2016 | |

| **Title** | **Patent Number or Application Number** | **Inventors** | **Filing Date** | **Issue Date** |
|---|---|---|---|---|
| SYNTHESIS AND COMPOSITION OF PHOTODYNAMIC THERAPEUTIC AGENTS FOR THE TARGETED TREATMENT OF CANCER | WO-2017044443-A1 | SUMITH KULARATNE, PRAVIN GAGARE, CARRIE H. MAYERS, SAKKARAPALAYAM M. MAHALINGAM, PHILIP S. LOW | 9/7/2016 | |
| CHIMERIC ANTIGEN RECEPTOR-EXPRESSING T CELLS AS ANTI-CANCER THERAPEUTICS | US-2017290900-A1 | PHILIP S. LOW, HAIYAN CHU, YONG GU LEE | 10/18/2016 | |
| MICRO-FLUIDIC SYSTEM USING MICRO-APERTURES FOR HIGH THROUGHPUT DETECTION OF CELLS | US-2017131283-A1 | CAGRI A. SAVRAN, PHILIP S. LOW, CHUN-LI CHANG, WANFENG HUANG | 11/18/2016 | |
| CA IX-TARGET NIR DYES AND THEIR USES | WO-2017161195-A1 | PHILIP S. LOW, SAKKARAPALAYAM M. MAHALINGAM, SUMITH KULARATNE, ISAAC MARKS | 3/16/2017 | |
| CARBONIC ANHYDRASE IX TARGETING AGENTS AND METHODS | WO-2017161170-A1 | PHILIP S. LOW, PENGCHENG LU | 3/16/2017 | |
| METHODS AND COMPOSITIONS FOR CAR T CELL THERAPY | WO-2017177149-A2 | PHILIP STEWART LOW, HAIYAN CHU, YONG GU LEE | 4/7/2017 | |
| METHOD OF TREATING CANCER BY TARGETING MYELOID-DERIVED SUPPRESSOR CELLS | WO-2017205661-A1 | PHILIP STEWART LOW, BINGBING WANG, CHRISTOPHER PAUL LEAMON, YINGJUAN J. LU, II LEROY W. WHEELER | 5/25/2017 | |
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**CURRENT LAB MEMBERS**

**Ph.D. Graduate Students**
Rami Alfar
Spencer Gardeen
John Hausman
Da Sol Jung
Spencer Lindeman
Xin Liu
Tayrn Miner
Jeffery Nielsen
Panae Noomuna
Mingding Wang
Boning Zhang (PULse)
Weichuan Luo

**Postdocs**
Stewart Low
Qian Luo
John Victor Napoleon
Daniel Sheik
Fenghua Zhang
Suilan Zheng

**Assistant Research Scientist**
Suraj Hettiarachchi

**Lab Manager**
Madduri Srinivasarao

**Undergraduates**
Melanie Tecktiel
Maria Bell
Henry Shen
Brad Readnour
Miranda Kaake
Soie Park
Evan Wood
Zach Todd
Sarah Kurdziel
Ben Cummins
Alice Wang
Yoonhee Nam
Morgan Pantone
Chris Howe
Nabilah Hamdiah Binti Che Sammudin
Mara Fattah

Elena Konrath
Anav Gagneja
Mohammed Ghazali
Seungyeon Jeong

**FORMER STUDENTS RECEIVING PhD DEGREES IN MY LAB**

Stephen Davio – 1981 – A Calorimetric Investigation of the Anion Transport Protein of the Human Erythrocyte Membrane and the Effect of Anesthetic Charge on Anesthetic-Phospholipid Interactions

Ken Appell – 1983 – Physical and Biochemical Properties of the Cytoplasmic Domain of The Erythrocyte Membrane Protein, Band 3

Stephen M. Waugh – 1986 – Hemichrome Binding to Erythrocyte Band 3: Implications in Red Blood Cell Aging

David Allen – 1988 – Identification of Band 3 Homologues in Non-erythroid Cell Types

Karen Smith – 1988 – Differential Scanning Calorimetry of Chloroplast Membranes

Leonard Maneri – 1989 – Protein-Lipid Interactions of the Human Erythrocyte Anion Transporter, Band 3

Bernard Thevenin – 1990 – Characterization of the Ankyrin-Band 3 Interaction of the Erythrocyte Membrane

Barry Willardson – 1990 – Localization of Peripheral Membrane Protein Binding Sites on the Cytoplasmic Domain of Erythrocyte Band 3

Rama Kannan – 1990 – Mechanism of Aging of Human Red Cells

Mark Horn – 1991 – Investigations into the biochemical mechanisms responsible for the initiation of the plant defense response and biotin-mediated delivery of macromolecules into plant cells.

Chris Lombardo – 1992 – Protein 4.1: Static and Dynamic Aspects of its Association with the Human Erythrocyte Membrane.

Jie Yuan - 1992 - Aging of Human Red Cells.

John Christian – 1992 – In Vivo Aging of Canine Biotinylated Erythrocytes: Validation and Preliminary Findings as a Model System for the Study of Erythrocyte Senescence

Laurent Legendre – 1993 – Signal Transduction During Activation of Plant Defenses Against Microbial Attack.

Chris Leamon – 1993 – Folate-Mediated Delivery of Macromolecules into Cultured animal Cells.

Bob Lee – 1994 – Tumor-specific Drug Delivery Mediated by the Folate Endocytosis Pathway.

C. C. Wang – 1995 – Expression, Mutagenesis, and Characterization of the Cytoplasmic Domain and Preliminary Analysis of an SH2 Domain in the Membrane-Spanning Domain of Erythrocyte Band 3.

Susan (Shen-Su) Wang – 1996 – Tumor-specific Targeting and Intracellular Delivery Mediated by the Folate Endocytosis Pathway

Sreeganga Chandra – 1997 – Signal Transduction Pathways of the Oxidative Burst

Qing Li – 1997 – Molecular Communication Between Platelets and Red Blood Cells

Heidi Van Dort (Clark) – 1997 – The Dynamics of Protein Interactions in Erythrocytes

Ryan Workman – 1998 – A Biochemical Study of the Interactions of Protein 4.1 with the Human Erythrocyte Membrane and Associated Cytoskeletal Components

Jeff Merida – 1998 – The Induction of the Oxidative Burst by Oligogalacturonic Acid Elicitors

Ann Schroeder – 1998 –The Plant Oxidative Burst Signal Transduction Pathways

Dina Andrews – 1999 – Molecular Communication between Red Blood Cells and Platelets during Clot Formation

Joseph Reddy – 1999 – Folate-Targeted Gene Delivery to Cancers

Michael Rettig – 2000 – Examination of the Erythrocyte Membrane During Senescence and Coagulation

Yingjuan (June) Lu – 2000 – Exploring the Potential of Folate Targeting in Anticancer Therapies

Steve Cessna – 2000 – The Role of Calcium in Signal Transduction Pathways Leading to the Plant Oxidative Burst

Mary Jo Turk – 2001 – Folate-Targeted Liposomal Drug Delivery: Applications from Cancer to Arthritis

Mike Kennedy – 2001 – Folate-targeted Imaging Agents

Seon-Hee Chang – 2002 – Protein Interactions on the Erythrocyte Membrane: Dynamic and Structural Aspects

Jitae Kim – 2002 – Mapkinase in Signal Transduction Pathways of the Plant Oxidative Burst

Chrystal Paulos – 2004 – From Optimal Dosing of Folate-Conjugates for the Diagnosis and Treatment of Cancer to Novel Therapies in Arthritis

William Anong – 2006 – Characterization of the Linkages Between The Erythrocyte Membrane and its Spectrin-Based Skeleton

Andrew R. Hilgenbrink – 2006 – Characterization of Folate Receptor Expressing Myeloid Cells and Folate Targeted Delivery of Small Molecule Drugs

Marko Stefanovic – 2006 – Examination of the Protein Interaction between Ankyrin and the Anion Exchanger in the Erythrocyte Membrane

Bindu Varghese – 2006 – Selective Targeting of Folate Conjugates to Activated Macrophages in Inflammatory Diseases

Jun Yang – 2006 – Visualization And Characterization of Receptor Endocytosis-Medicated Drug Release In Cancer

Emanuela I. (Ligia) Sega – 2006 – Folate Receptor-Targeted Immunotherapy of Cancer: Identification of the Mechanism of Action and Augmentation of the Therapeutic Efficacy through the Addition of Standard and Novel Therapies

Walter A. Henne, Jr. – 2007 – Low Molecular Weight, High Affinity Ligand-based Drug Delivery and Diagnostic Systems

Erina Vlashi – 2007 – Real Time, Non-Invasive, In Vivo Imaging Of Targeted Drugs To Solid Tumors Via A High Affinity Ligand: Implications To Improving Targeted-Drug Delivery

Tahlia Weis – 2007 – Mapping the Binding Domains of Band 3 on Adducin and Cytokine Effects on RBCs

Derek Doorneweerd – 2007 – Low Molecular Weight, High Affinity Targeting Ligands for use in Therapeutics and Diagnostics Systems

Wei He – 2008 – Multiparametric Analysis of Single Circulating Cell by Intravital Flow Cytometry

Wilfredo Ayala-Lopez – 2009 – Folate-Receptor Meidated Targeting of Diagnostics and Therapeutics to Activated Macrophages in Inflammation

Sumith Kularatne – 2009 – Targeted Drugs for Cancer and Inflammatory Disease

Gayani Kodippili – 2009 - Band 3 Diffusion on Healthy and Diseased Red Blood Cells and Implications for RBC Membrane Structure

Balasubramanian, Vaitilingam – 2009 - Folate Receptor Targeted Imaging Agents for the Differential Diagnosis of Cancer from Inflammation

Wei Xia – 2009 - Characterization Of Folate Receptor Positive Monocytes/Macrophages And Folate Receptor-Mediated Specific Targeting In Inflammatory Diseases

Jesse Grey – 2011 - Elucidation Of The Interactions Between Band 3 And Ankyrin

Taina Franco – 2011 - Characterization And Mapping Of The Interaction Between The Cytoplasmic Domain Of Band 3 And Adducin

Florenta Sega – 2011 – Mediation of O2-Dependent Erythrocyte Properties

Scott Poh – 2012 – Comparison of Nanoparticle Uptake by Cancers Versus Sites of Inflammation

Katie Giger – 2012 – Characterization of Erythrocyte Cytoskeletal Regulation by Monitoring Membrane-Spanning Protein Diffusion

Charity Wayua – 2012 – Development of Targeted Imaging and Therapeutic Agents for Cholecystokinin 2 Receptor Expressing Tumors

Jiayin Shen – 2013 – Folate Receptor Beta: A New Surface Molecule For Selective Targeting Of Activated Macrophages In Inflammatory Diseases And Cancer

Mike Hansen – 2013 – Folate Receptor Positive Adipose Tissue Macrophages And EC0746, A Folate Conjugated Anti-Inflammatory Drug

Lindsay Kelderhouse – 2013 – Folate Receptor-Targeted Imaging Agents For Cancer And Inflammatory Diseases

Haiyan Chu – 2014 - Mechanism Of Oxygen Regulation Of Erythrocyte Properties

N. Achini Bandara – 2015 – Immunotherapy Of Folate Receptor Expressing Cancers

Kristina Kesely – 2016 - Investigating Human Erythrocyte Band 3 Tyrosine Phosphorylation and its Involvement in the *Plasmodium Falciparum* Infection

Jyoti Roy – 2017 – Small Molecule Targeted Imaging and Therapeutic Agent for Luteinizing Hormone Releasing, Hormone Receptor, and Fibroblast Activation Protein Alpha

Suilan Zhang – 2017 – Reversible Band 3-Hemoglobin Association Serves As A Molecular Switch For Oxygen-Dependent Regulation Of Red Blood Cell Properties

Isaac Marks – 2018 - Design, Synthesis, And Biological Evaluation Of Small Molecule Drug Conjugates Targeting The Carbonic Anhydrase IX Receptor And Investigation Of A Ligand Targeted Strategy For Targeted Cell-Based Therapies

Yong Gu Lee – 2018 - Design Of A Universal Chimeric Antigen Receptor-Expressing T Cells And Associated Tumor Targeting Ligands For Controlled Destruction Of Solid Tumors

**FORMER STUDENTS RECEIVING MASTERS DEGREES IN MY LAB**

Nancy Balishin – 1987 – The Isolation, Purification, Modification and Preliminary Crystallization of the Cytoplasmic Domain of Band 3

Susan Holladay – 1995 – Riboflavin-mediated Delivery of Macromolecules into Cultured Cells.

Shannon Dwyer – 1995 - Plant and human neutrophil oxidative burst complexes are immunologically and pharmacologically related.

Andrew Breite – 2002 – Mapping the Amino Acids at the N-terminus of CDB3 Critical for Association of Glycolytic Enzymes

Leo Solomon Lucas – 2006 – Selective Targeting of Folate Receptor Alpha by Reduced Folate Analog

Katya Simon – 2007 – Estimating the Accuracy of Protein Structures using Residual Dipolar Couplings

Young-Su Yi – 2008 – Selective Targeting of Folate Receptor-Beta on Macrophages for Immunotherapy and Imaging of Inflammatory Diseases

Dayang Chen – 2015 - Optimization Of Linker Properties For Ligand-Mediated Capture Of Circulating Tumor Cells

Gregory Jarvis – 2015 – Chemical Synthesis Of Bacterial Siderophores And Applications In Pathogen Detection

Alyssa Snyder – 2017 - Erythrocyte Phosphorylation In Sickle Cell Disease

**COURSES TAUGHT**

Teaching Assignments

| Year | Fall | Spring |
|---|---|---|
| 76-77 | 333 | 534, 534L |
| 77-78 | 333 | 534, 534L, 127 |
| 78-79 | 333 | 534 |
| 79-80 | 696A | 333 |
| 80-81 | 696A, 695H | 333, 695H |
| 81-82 | 634 | 632 |
| 82-83 | 634 | 333 |
| 83-84 | 634 | 632 |
| 84-85 | 634 | 333 |
| 85-86 | 634 | 632 |
| 86-87 | 634 | sabbatical |
| 87-88 | 634 | 632 |
| 88-89 | 634 | 333 |
| 89-90 | 634 | 632, 695B |
| 90-91 | 634 | 333 |
| 91-92 | 634 | 632 |
| 92-93 | 634 | 333 |
| 93-94 | 634 | 632 |
| 94-95 | 634, 695B, 695M | 695B, 695M |
| 96-97 | 634 | 333 |
| 97-98 | 533 | 632 |
| 98-99 | 333 | 538 |
| 99-00 | 333 | 632 |
| 00-01 | 333 | 538 |
| 01-02 | 632 | 538 |
| 02-03 | 634 | 538 |
| 03-04 | 632 | 538 |
| 04-05 | 632 | sabbatical |
| 05-06 | 632 | 538 |
| 06-07 | 632 | 538 |
| 07-08 | 632 | 538 |
| 08-09 | 632 | 538 |
| 09-10 | 632 | 538 |
| 10-11 | 632 | 538 |
| 11-12 | 632 | 538 |
| 12-13 | 632 | 538 |