

Thomas C. Baker

Distinguished Professor of Entomology and Chemical Ecology

Department of Entomology
Center for Chemical Ecology
Penn State University
Chemical Ecology Laboratory
University Park, PA 16802

ACADEMIC RECORD

B.S.	Entomology	Cornell University	1972
M.S.	Entomology	Cornell University	1975
Ph.D.	Entomology	Michigan State University	1979

EMPLOYMENT HISTORY

Assistant Professor
Department of Entomology
University of California, Riverside, CA
1979-1983

Associate Professor
Department of Entomology
University of California
Riverside, CA
1983-1988

Professor
Department of Entomology
University of California, Riverside, CA
1988-1992

Professor
Department of Entomology
Iowa State University, Ames, Iowa
1992 - 2003

Head
Division of Toxicology and Physiology
University of California, Riverside, CA
1986-1988

Chair
Department of Entomology
University of California, Riverside, CA
1988-1992

Chair
Department of Entomology
Iowa State University, Ames, IA
1992-1999

Professor
Department of Entomology
Huck Institutes for the Life Sciences
Penn State University
2003 - 2010

University Distinguished Professor
Department of Entomology
Huck Institutes for the Life Sciences
Penn State University
University Park, Pennsylvania
2010 - present

RESEARCH/PROFESSIONAL ACTIVITY

Editorial Boards

Member, Editorial Board, *Physiological Entomology* 1983-Present
Member, Editorial Board, *Journal of Chemical Ecology* 1983-1998
Member, Editorial Board, *Annual Review of Entomology* 1995-2000
Member, Editorial Board, *Journal of Asia-Pacific Entomology* 1998-Present

Professional Society Memberships

Entomological Society of America (continuous, since 1975)
International Society of Chemical Ecology
Association for Chemoreception Sciences
Fellow, American Association for the Advancement of Science
Councilor, Asia-Pacific Association for Chemical Ecology (APACE)

Awards and Honors

Recipient of the 2015 Founders Memorial Lecture Award, Entomological Society of America
Recipient of the Silver Medal for career achievement in Chemical Ecology from the
International Society of Chemical Ecology, 2012.
Awarded the title, "University Distinguished Professor" by Penn State University 2010
Elected Fellow, Entomological Society of America, 2009.
President, International Society of Chemical Ecology (2003-2004).
Recipient of Silverstein-Simeone Award (2001-2002) from the International
Society of Chemical Ecology.
Elected Fellow, American Association for the Advancement of Science. 1999.
Excellence in Pest Management Award, North Central Branch of the
Entomological Society of America, 1996.
Bussart Award, Pacific Branch of ESA, 1988, 1990, 1991.
Distinguished Teaching Award, Pacific Branch of the Entomological Society of America,
1983, 1984.
Silverstein-Simeone Plenary Lecture, International Society of Chemical Ecology,
Hamburg, Germany, 2002.
Keynote Speaker, IC-E³ Symposium, Lund/Alnarp Sweden 2016.
Griswold Lecturer in Entomology, Cornell University, April, 2013.
MacCarthy Lecturer in Integrated Pest Management, Simon Fraser University and
University of British Columbia. October 1996.
Plenary Lecturer, Plenary Session of the ESA National Meeting, Reno, NV, 1991. Title:
"Learning the Language of Insects, and How to Talk Back"
Plenary Lecturer, Asia-Pacific Association of Chemical Ecologists. 2007, Tsukuba, Japan
Plenary Lecturer, Korean Society for Applied Entomology Annual Meeting,
Seoul, Korea 1997

Plenary Lecturer (Banquet Speech), Eastern Branch Meeting of the ESA, Harrisburg, PA, March 21, 2005.

Plenary Lecturer, Asia-Pacific Association of Chemical Ecology, Shanghai, China. November 1, 1999

Plenary Lecturer, Entomological Society of Manitoba, Winnipeg, Canada. November 5, 1992

Plenary Lecturer, 2nd Australia/New Zealand (CSIRO/DSIR) Pheromone Conference, Canberra, Australia, July 12, 1988

Patents Awarded

1. U.S. Patent No. 3,917,711. 1975. "Novel Attractant Components for Males of the Tobacco Budworm Moth". W. L. Roelofs, A. S. Hill, T. C. Baker, and R. T. Cardé, Inventors.
2. U. S. Patent No. 3,952,093. April 20, 1976. "Novel Attractant Components for Males of the Tobacco Budworm Moth". W. L. Roelofs, A. S. Hill, and T. C. Baker, Inventors.
3. U. S. Patent No. 5,104,654. April 14, 1992. "Ovipositional Disruption of the Navel Orangeworm With Fatty Acids." T. C. Baker and P. L. Phelan, Inventors.
4. U. S. Patent No. 5,128,333. July 7, 1992. "Phosphates and Phosphonates as Disruptants of Moth Sex Pheromone-Mediated Behavior." T. R. Fukuto, T. C. Baker, M. Malik, and R. S. Vetter, Inventors.
5. U. S. Patent No. 6,106,821 August 22, 2000. "Fly Attractant Compositions" . T. C. Baker and A. A. Cossé, Inventors.
6. U.S. Patent No. 6,524,605. "Biorational Repellents Obtained from Terpenoids for use Against Arthropods" J.R. Coats, C. Peterson, J.W. Zhu, T. C. Baker, Inventors.
7. U.S. Patent No. 6,543,181. "Attractant Blend for Drosophila Fruit Flies". T. C. Baker, J.W. Zhu, K.C. Park, Inventors.
8. U.S. Patent No. 6,562,332. "Attractants of Beneficial Insects" T.C. Baker, J. J. Obrycki, J.W. Zhu, Inventors.

LIST OF PUBLICATIONS

Refereed, Scientific Journal Articles

1. Roelofs, W.L., A.S. Hill, R.T. Cardé and T.C. Baker. 1974. Two sex pheromone components of the tobacco budworm moth, *Heliothis virescens*. **Life Sci.** 14:1555-1562.
2. Baker, T.C. and G.C. Eickwort. 1975. Development and bionomics of *Chrysomelobia labidomerae* (Acari:Tarsonemina; Podapolipidae), a parasite of the milkweed leaf beetle (Coleoptera:Chrysomelidae). **Can. Entomol.** 107:627-638.
3. Cardé, R.T., A. Comeau, T.C. Baker and W.L. Roelofs. 1975. Moth mating periodicity: Temperature regulates the circadian gate. **Experientia** 31:46-48.
4. Cardé, R.T., T.C. Baker and W.L. Roelofs. 1975. Behavioral role of individual components of a multichemical attractant system in the oriental fruit moth. **Nature** 253:348-349.

5. Cardé, R.T., T.C. Baker and W.L. Roelofs. 1975. Ethological function of components of a sex attractant system for oriental fruit moth males, *Grapholitha molesta* (Lepidoptera:Tortricidae). **J. Chem. Ecol.** 1:475-491.
6. Cardé, R.T., T.C. Baker and W.L. Roelofs. 1976. Sex attractant responses of male oriental fruit moths to a range of component ratios: Pheromone polymorphism? **Experientia** 32:1406-1407.
7. Baker, T.C., R.T. Cardé and W.L. Roelofs. 1976. Behavioral responses of male *Argyrotaenia velutinana* (Lepidoptera:Tortricidae) to components of its sex pheromone. **J. Chem. Ecol.** 2:333-352.
8. Baker, T.C. and W.L. Roelofs. 1976. Electroantennogram responses of the male moth, *Argyrotaenia velutinana* to mixtures of sex pheromone components of the female. **J. Insect Physiol.** 22:1357-1364.
9. Miller, J.R., T.C. Baker, R.T. Cardé and W.L. Roelofs. 1976. Reinvestigation of oak leaf roller sex pheromone components and the hypothesis that they vary with diet. **Science** 192:140-143.
10. Cardé, R.T., T.C. Baker and P.J. Castrovillo. 1977. Disruption of sexual communication in *Laspeyresia pomonella* (codling moth), *Grapholitha molesta* (oriental fruit moth) and *G. prunivora* (lesser appleworm) with hollow fiber attractant sources. **Entomol. exp. et Appl.** 22:280-288.
11. Cardé, R.T., C.C. Doane, T.C. Baker, S. Iwaki and S. Marumo. 1977. Attractancy of optically active pheromone for male gypsy moths. **Environ. Entomol.** 6:768-772.
12. Baker, T.C. and R.T. Cardé. 1978. Disruption of gypsy moth male sex pheromone behavior by high frequency sound. **Environ. Entomol.** 7:45-52.
13. Cardé, A.M., T.C. Baker and R.T. Cardé. 1979. Identification of a four-component sex pheromone of the female oriental fruit moth, *Grapholitha molesta* (Lepidoptera:Tortricidae). **J. Chem. Ecol.** 5:423-427.
14. Baker, T.C. and R.T. Cardé. 1979. Courtship behavior of the oriental fruit moth (*Grapholitha molesta*): Experimental analysis and consideration of the role of sexual selection in the evolution of courtship pheromones in the Lepidoptera. **Ann. Entomol. Soc. Am.** 72:173-188.
15. Baker, T.C. and R.T. Cardé. 1979. Analysis of pheromone-mediated behaviors in male *Grapholitha molesta*, the oriental fruit moth (Lepidoptera:Tortricidae). **Environ. Entomol.** 8:956-968.
16. Baker, T. C. and R. T. Cardé. 1979. Endogenous and exogenous factors affecting periodicities of female calling and male sex pheromone response in *Grapholitha molesta* (Busck). **J. Insect. Physiol.** 25:943-950.

17. Baker, T.C., R.T. Cardé and B.A. Croft. 1980. Relationship between pheromone trap capture and emergence of adult oriental fruit moths, *Grapholitha molesta* (Lepidoptera:Tortricidae). **Can. Entomol.** 112:11-15.
18. Baker, T.C., R.T. Cardé and J.R. Miller. 1980. Oriental fruit moth pheromone component emission rates measured after collection by glass-surface adsorption. **J. Chem. Ecol.** 6:749-758.
19. Baker, T.C. and W.L. Roelofs. 1981. Initiation and termination of oriental fruit moth male response to pheromone concentrations in the field. **Environ. Entomol.** 10:211-218.
20. Kuenen, L.P.S. and T.C. Baker. 1981. Habituation versus sensory adaptation as the cause of reduced attraction following pulsed and constant sex pheromone pre-exposure in *Trichopolusia ni*. **J. Insect Physiol.** 27:721-726.
21. Van Vorhis Key, S.E., L.K. Gaston and T.C. Baker. 1981. Effects of gaster extract trail concentration on the trail following behavior of the Argentine ant, *Iridomyrmex humilis* (Mayr). **J. Insect Physiol.** 27:363-370.
22. Persoons, C.J., C. van der Kraan, W.J. Nooijen, F.J. Ritter, S. Voerman and T.C. Baker. 1981. Sex pheromone of the beet armyworm, *Spodoptera exigua*: Isolation, identification and preliminary field evaluation. **Ent. exp. et Appl.** 30:98-99.
23. Baker, T.C., W. Meyer and W.L. Roelofs. 1981. Sex pheromone dosage and blend specificity of response by oriental fruit moth males. **Entomol. exp. et Appl.** 30:269-279.
24. Baker, T.C., R. Nishida and W.L. Roelofs. 1981. Close-range attraction of female oriental fruit moths to herbal scent of male hairpencils. **Science** 214:1359-1361.
25. Baker, T.C., L.K. Gaston, M.M. Pope, L.P.S. Kuenen and R.S. Vetter. 1981. A high-efficiency collection device for quantifying sex pheromone volatilized from female glands and synthetic sources. **J. Chem. Ecol.** 7:961-968.
26. Van Vorhis Key, S.E. and T.C. Baker. 1981. Trail-following responses of the Argentine ant, *Iridomyrmex humilis* (Mayr), to a synthetic trail pheromone component and analogs. **J. Chem. Ecol.** 8:3-14.
27. Baker, T.C. and L.P.S. Kuenen. 1982. Pheromone source location by flying moths: A supplementary non-anemotactic mechanism. **Science** 16:424-427.
28. Pope, M.M., L.K. Gaston and T.C. Baker. 1982. Composition, quantification, and periodicity of sex pheromone gland volatiles from individual *Heliothis virescens* females. **J. Chem. Ecol.** 8:1043-1055.

29. Nishida, R., T.C. Baker and W.L. Roelofs. 1982. Hairpencil pheromone components of male oriental fruit moths, *Grapholitha molesta*. **J. Chem. Ecol.** 8:947-959.
30. Kuenen, L.P.S. and T.C. Baker. 1982. Optomotor regulation of ground velocity in moths during flight to sex pheromone at different heights. **Physiol. Entomol.** 7:193-202.
31. Van Vorhis Key, S.E. and T.C. Baker. 1982. Specificity of laboratory trail following by the Argentine ant, *Iridomyrmex humilis* (Mayr), to (Z)-9-hexadecenal, analogs and gaster extract. **J. Chem. Ecol.** 8:1057-1063.
32. Kuenen, L.P.S. and T.C. Baker. 1982. The effects of pheromone concentration on the flight behavior of the oriental fruit moth, *Grapholitha molesta*. **Physiol. Entomol.** 7:423-434.
33. Baker, T. C. 1983. Variations in male oriental fruit moth courtship patterns due to male competition. **Experientia** 39:112-114.
34. Van Vorhis Key, S.E. and T.C. Baker. 1982. Trail pheromone-conditioned anemotaxis by the Argentine ant. *Iridomyrmex humilis*. **Entomol. exp. et Appl.** 32:232-237.
35. Vetter, R.S. and T.C. Baker. 1983. Behavioral responses of male *Heliothis virescens* in a sustained-flight tunnel to combinations of seven compounds identified from female sex pheromone glands. **J. Chem. Ecol.** 9:747-759.
36. Kuenen, L.P.S. and T.C. Baker. 1983. A non-anemotactic mechanism used in pheromone source location by flying moths. **Physiol. Entomol.** 8:277-289.
37. Haynes, K.F., L.K. Gaston, M.M. Pope and T.C. Baker. 1983. Rate and periodicity of pheromone release from individual female artichoke plume moths, *Platyptilia carduidactyla* (Lepidoptera:Pterophoridae). **Environ. Entomol.** 12:1597-1600.
38. Vetter, R.S. and T.C. Baker. 1984. Behavioral responses of male *Heliothis zea* moths in sustained-flight tunnel to combinations of 4 compounds identified from female sex pheromone glands. **J. Chem. Ecol.** 10:193-202.
39. Willis, M.A. and T.C. Baker. 1984. Effects of intermittent and continuous pheromone stimulation on the flight behaviour of the oriental fruit moth, *Grapholitha molesta*. **Physiol. Entomol.** 9:341-589.
40. Baker, T.C., M.A. Willis and P.L. Phelan. 1984. Optomotor anemotaxis polarizes self-steered zigzagging in flying moths. **Physiol. Entomol.** 9:365-376.

41. Haynes, K.F., L.K. Gaston, M.M. Pope and T.C. Baker. 1984. Potential for evolution of resistance to pheromones: Interindividual and interpopulational variation in chemical communication system of pink bollworm moth. **J. Chem. Ecol.** 10:1551-1565.
42. Trumble, J.T. and T.C. Baker. 1984. Flight phenology and pheromone trapping of *Spodoptera exigua* (Hübner) (Lepidoptera:Noctuidae) in southern coastal California. **Environ. Entomol.** 13:1278-1282.
43. Pope, M.M., L.K. Gaston and T.C. Baker. 1984. Composition, quantification, and periodicity of sex pheromone volatiles from individual *Heliothis zea* females. **J. Insect Physiol.** 30:943-945.
44. Haynes, K.F. and T.C. Baker. 1985. Sublethal effects of permethrin on the chemical communication system of pink bollworm moth, *Pectinophora gossypiella*. **Arch. Insect Biochem. Physiol.** 2:283-293.
45. Baker, T.C., S.E. Van Vorhis Key and L.K. Gaston. 1985. Bait-preference tests for the Argentine ant (Hymenoptera:Formicidae). **J. Econ. Entomol.** 78:1083-1088.
46. Van Vorhis Key, S.E. and T.C. Baker. 1985. Observations on the trail deposition and recruitment behaviors of the Argentine ant, *Iridomyrmex humilis* (Hymenoptera:Formicidae). **Ann. Ent. Soc. Am.** 79:283-288.
47. Baker, T.C., M.A. Willis, K.F. Haynes and P.L. Phelan. 1985. A pulsed cloud of sex pheromone elicits upwind flight in male moths. **Physiol. Entomol.** 10:257-265.
48. Phelan, P.L., P.J. Silk, C.J. Northcott, S.H. Tan and T.C. Baker. 1986. Chemical identification and behavioral characterization of male wing pheromone of *Ephestia elutella* (Pyralidae). **J. Chem. Ecol.** 12:135-146.
49. Li, W., K.F. Haynes and T.C. Baker. 1986. Sensory and behavioral effects of gossypure alcohol on sex pheromone response of male pink bollworm moths, *Pectinophora gossypiella*. **J. Chem. Ecol.** 12:25-38.
50. Phelan, P.L. and T.C. Baker. 1986. Cross-attraction of five species of stored-product Phycitinae (Lepidoptera:Pyralidae) in a wind tunnel. **Environ. Entomol.** 15:369-372.
51. Phelan, P.L. and T.C. Baker. 1986. Male-size-related courtship success and intersexual selection in the tobacco moth, *Ephestia elutella*. **Experientia** 42:1291-1293.
52. Haynes, K.F., T.A. Miller, R.T. Staten, W.-G. Li and T.C. Baker. 1986. Monitoring insecticide resistance with insect pheromones. **Experientia** 42:1293-1295.

53. Haynes, K.F., W.-G. Li and T.C. Baker. 1986. Control of pink bollworm moth (Lepidoptera:Gelechiidae) with insecticides and pheromones (attracticide): Lethal and sublethal effects. **J. Econ. Entomol.** 79:1466-1471.
54. Phelan, P.L. and T.C. Baker. 1987. Evolution of male pheromones in moths: Reproductive isolation through sexual selection? **Science** 235:205-207.
55. Haynes, K.F., T.A. Miller, R.T. Staten, W.-G. Li and T.C. Baker. 1987. Pheromone trap for monitoring insecticide resistance in the pink bollworm moth (Lepidoptera:Gelechiidae): New tool for resistance management. **Environ. Entomol.** 16:84-89.
56. Baker, T.C. and K.F. Haynes. 1987. Manoeuvres used by flying male oriental fruit moths to relocate a sex pheromone plume in an experimentally shifted wind-field. **Physiol. Entomol.** 12:263-279.
57. Willis, M.A. and T.C. Baker. 1987. Comparison of manoeuvres used by walking versus flying *Grapholitha molesta* males during pheromone-mediated upwind movement. **J. Insect Physiol.** 33:875-883.
58. Phelan, P.L. and T.C. Baker. 1987. An attracticide for control of *Amyelois transitella* (Lepidoptera:Pyralidae) in almonds. **J. Econ. Entomol.** 80:779-783.
59. Haynes, K.F. and T.C. Baker. 1987. Potential for evolution of resistance to pheromones: World-wide and local variation in chemical communication system of pink bollworm moth, *Pectinophora gossypiella*. **J. Chem. Ecol.** 14:1547-1560.
60. Willis, M.A. and T.C. Baker. 1988. Effects of varying sex pheromone component ratios on the zigzagging flight movements of the oriental fruit moth, *Grapholitha molesta*. **J. Insect Behav.** 1:357-371.
61. Baker, T.C. and R.G. Vogt. 1988. Measured behavioural latency in response to sex-pheromone loss in the large silk moth *Antheraea polyphemus*. **J. Exp. Biol.** 137:29-38.
62. Baker, T.C., B.S. Hansson, C. Löfstedt and J. Löfqvist. 1988. Adaptation of antennal neurons in moths is associated with cessation of pheromone-mediated upwind flight. **Proc. Natl. Acad. Sci.** 85:9826-9830.
63. Baker, T.C. and K.F. Haynes. 1989. Field and laboratory electroantennographic measurements of pheromone plume structure correlated with oriental fruit moth behaviour. **Physiol. Entomol.** 14:1-12.
64. Baker, T.C., W. Francke, C. Löfstedt, B.S. Hansson, J.-W. Du, P.L. Phelan, R.S. Vetter and R. Youngman. 1989. Isolation, identification and synthesis of sex pheromone components of the carob moth, *Ectomyelois ceratoniae*. **Tetrahedron Lett.** 30:2901-2902.

65. Youngman, R.R. and T.C. Baker. 1989. Host odor mediated response of female navel orangeworm moths (Lepidoptera:Pyralidae) to black and white sticky traps. **J. Econ. Entomol.** 82:1339-1343.
66. Löfstedt, C., N.J. Vickers, W.L. Roelofs and T.C. Baker. 1989. Diet related courtship success in the oriental fruit moth, *Grapholitha molesta* (Tortricidae). **Oikos** 55:402-408.
67. Haynes, K.F. and T.C. Baker. 1989. An analysis of anemotactic flight in female moths stimulated by host odour and comparison with the males' response to sex pheromone. **Physiol. Entomol.** 14:279-289.
68. Vetter, R.S., R.M. Esposito II and T.C. Baker. 1989. Mass rearing of the oriental fruit moth (Lepidoptera:Tortricidae). **J. Econ. Entomol.** 82:1825-1829.
69. Vetter, R.S. and T.C. Baker. 1990. Sterile pink bollworm moth (Lepidoptera: Gelechiidae) pheromone emission and courtship success. **Environ. Entomol.** 19:21-25.
70. Baker, T.C., B.S. Hansson, C. Löfstedt and J. Löfqvist. 1989. Adaptation of male moth antennal neurons in a pheromone plume is associated with cessation of pheromone-mediated flight. **Chem. Senses** 14:439-448.
71. Phelan, P.L. and T.C. Baker. 1990. Information transmission during intra- and interspecific courtship in *Ephestia elutella* and *Cadra figulilella*. **J. Insect Behav.** 3:589-602.
72. Phelan, P.L. and T.C. Baker. 1990. Comparative study of courtship in twelve phycitine moths (Lepidoptera:Pyralidae). **J. Insect Behav.** 3:303-326.
73. Wiesenborn, W.D. and T.C. Baker. 1990. Upwind flight to cotton flowers by *Pectinophora gossypiella* (Lepidoptera:Gelechiidae). **Environ. Entomol.** 19:490-493.
74. Löfstedt, C., N.J. Vickers and T.C. Baker. 1990. Courtship, pheromone titre and determination of the male mating success in the Oriental fruit moth, *Grapholitha molesta* (Lepidoptera:Tortricidae). **Entomol. Gener.** 15(2):121-125.
75. Phelan, P.L., C.J. Roelofs, R. Youngman and T.C. Baker. 1991. Characterization of chemicals mediating ovipositional host-plant finding by *Amyelois transitella* females. **J. Chem. Ecol.** 17:599-613.
76. Malik, M.S., R.S. Vetter, T.C. Baker and T.R. Fukuto. 1991. Dialkyl phosphorofluoridates and alkyl methylphosphonofluoridates as disruptants of moth sex pheromone-mediated behavior. **Pestic. Sci.** 32:35-46.

77. Baker, T.C., W. Francke, J.G. Millar, C. Lofstedt, B. Hansson, J.W. Du, P.L. Phelan, R.S. Vetter, R. Youngman and J.L. Todd. 1991. Identification and bioassay of sex pheromone components of carob moth, *Ectomyelois ceratoniae* (Zeller). **J. Chem. Ecol.** 17:1973-1988.
78. Vickers, N.J. and T.C. Baker. 1991. The effects of unilateral antennectomy on the flight behaviour of male *Heliothis virescens* in a pheromone plume. **Physiol. Entomol.** 16:497-506.
79. Hansson, B.S. and T.C. Baker. 1991. Differential adaptation rates in a male moth's sex pheromone receptor neurons. **Naturwissenschaften** 78:517-520.
80. Vickers, N.J., T.A. Christensen, H. Mustaparta and T.C. Baker. 1991. Chemical communication in heliothine moths III. Flight behavior of male *Helicoverpa zea* and *Heliothis virescens* in response to varying ratios of intra- and interspecific sex pheromone components. **J. Comp. Physiol. A.** 169:275-280.
81. Vickers, N.J. and T.C. Baker. 1992. Male *Heliothis virescens* sustain upwind flight in response to experimentally pulsed filaments of their sex-pheromone. **J. Insect Behav.** 5:669-687.
82. Todd, J.L., K.F. Haynes and T.C. Baker. 1992. Antennal neurons specific for redundant pheromone components discovered in normal and mutant *Trichoplusia ni* males. **Physiol. Entomol.** 17:183-192.
83. Figueredo, A.J. and T.C. Baker. 1992. Reduction of response to sex pheromone in the oriental fruit moth following successive pheromonal exposures. **J. Insect Behav.** 5:347-363.
84. Bartelt, R.J., P.F. Dowd, R.S. Vetter, H.H. Shorey and T.C. Baker. 1992. Responses to synthetic pheromone and host-related coattractants by *Carpophilus hemipterus* (Coleoptera:Nitidulidae) in California field tests. **Environ. Entomol.** 21:1-11.
85. Todd, J.L., J.G. Millar, R.S. Vetter and T.C. Baker. 1992. Behavioral and electrophysiological activity of (Z,E) -7,9,11-dodecatrienyl formate, a mimic of the major sex pheromone component of carob moth, *Ectomyelois ceratoniae*. **J. Chem. Ecol.** 18:2331-2351.
86. Bartelt, R.J., D.G. Carlson, R.S. Vetter, and T.C. Baker. 1993. Male-produced aggregation pheromone of *Carpophilus mutilatus* (Coleoptera:Nitidulidae). **J. Chem. Ecol.** 19:107-118.
87. Cossé, A.A., J.J. Endris, J.G. Millar, and T.C. Baker. 1994. Identification of volatile compounds from fungus-infected date fruit that stimulate upwind flight in female *Ectomyelois ceratoniae*. **Entomol. exp. et Appl.** 72:233-238.

88. Endris, J.J., and T.C. Baker. 1993. Action potentials recorded from the foreleg of *Varroa jacobsoni* after olfactory stimulation. **Apidologie**. 24:488-489.
89. Todd, J.L., and T.C. Baker. 1993. Response of single antennal neurons of female cabbage loopers to behaviorally active attractants. **Naturwiss**. 80:183-186.
90. Vickers, N.J., and T.C. Baker. 1994. Visual Feedback in the control of pheromone-mediated flight of *Heliothis virescens* males (Lepidoptera:Noctuidae). **J. Insect Behav.** 7:605-632.
91. Vickers, N.J. and T.C. Baker. 1994. Reiterative responses to single strands of odor promote sustained upwind flight and odor source location by moths. **Proc. Nat. Acad Sci. (USA)** 91:5756-5760.
92. Willis, M.A. and T.C. Baker. 1994. Behaviour of flying oriental fruit moth males during approach to sex pheromone sources. **Physiol. Entomol.** 19:61-69.
93. Bartelt, R.J., R.S. Vetter, D.G. Carlson and T.C. Baker. 1994. Influence of pheromone dose, trap height, and septum age on effectiveness of pheromones for *Carpophilus mutilatus* and *C. hemipterus* (Coleoptera:Nitidulida) in a California date garden. **J. Econ. Entomol.** 87:667-675.
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Invited Chapters and Review Articles:

1. Roelofs, W.L., J.R. Miller and T.C. Baker. 1976. Pheromones of lepidopterous insects. In "Perspectives in Forest Entomology." Academic Press, pp. 111-125.
2. Cardé, R.T. and T.C. Baker. 1984. Sexual communication with pheromones. In "Chemical Ecology of Insects," W. Bell and R.T. Cardé (eds.). Chapman and Hall Publishing Corp., pp. 355-383.
3. Baker, T.C. and R.T. Cardé. 1984. Techniques for behavioral bioassays. In "Techniques in Pheromone Research," H. Hummel and T.A. Miller (eds.). Springer-Verlag, New York, pp. 45-73.
4. Baker, T.C. 1985. Chemical control of behaviour. In "Comprehensive Insect Physiology, Biochemistry, and Pharmacology," G.A. Kerkut and L.S. Gilbert (eds.). Pergamon Press, Ltd., pp. 621-672.

5. Baker, T.C. and C.E. Linn, Jr. 1984. Wind tunnels in pheromone research. In "Techniques in Pheromone Research," H. Hummel and T.A. Miller (eds.). Springer-Verlag, New York, pp. 75-110.
6. Nishida, R., H. Fukami, T.C. Baker, W.L. Roelofs and T.E. Acree. 1985. Oriental fruit moth pheromone: Attraction of females by an herbal essence. In "Semiochemistry: Flavors and Pheromones," T.E. Acree and D.M. Soderlund (eds.). DeGruyter, New York, pp. 47-63.
7. Baker, T.C. 1985. Behavioral analysis of pheromones. In "Semiochemistry: Flavors and Pheromones," T.E. Acree and D.M. Soderlund (eds.). DeGruyter, New York, pp. 141-168.
8. Baker, T.C. 1986. Pheromone-modulated movements of flying moths. In "Mechanisms in Insect Olfaction" (NSF-NATO Symposium), T.L. Payne, C. Kennedy and M.C. Birch (eds.). Clarendon Press, Oxford, pp. 39-48.
9. Baker, T.C. 1989. Pheromones and flight behaviour. In "Insect Flight," G.G. Goldsworthy and C. Wheeler (eds.). CRC Press, Boca Raton, Florida, pp. 231-255.
10. Baker, T.C. 1989. Sex pheromone communication in the Lepidoptera: New research progress. *Experientia* 45:248-262.
11. Baker, T.C. 1989. Sensory adaptation: A simple sensory event with profound effects on the behaviour of male moths. In "Application of Pheromones to Pest Control," T.E. Bellas, (ed.) Proc. Joint CSIRO-DSIR Workshop, July 11-14, 1988, Canberra, Australia, pp. 3-14.
12. Birch, M.C., G.M. Poppy and T.C. Baker. 1990. Scents and eversible scent structures of male moths. *Ann. Rev. Entomol.* 35:25-58.
13. Baker, T.C., R.T. Staten and H.M. Flint. 1989. Use of pink bollworm pheromone in the southwestern United States. In "Behavior-Modifying Chemicals for Insect Management," R. Ridgway, R.M. Silverstein and May Insoe (eds.). Marcel Dekker, Inc., New York, pp. 417-436.
14. Baker, T.C. 1990. Upwind flight and casting flight: Complimentary phasic and tonic systems used for location of sex pheromone sources by male moths. In "ISOT X, Proc. 10th Intl. Symp. Olfac. Taste.," K. Døving (ed.). GCS/AS Oslo, pp. 18-25.
15. Baker, T.C. 1989. Origin of courtship and sex pheromones of the oriental fruit moth and a discussion of the role of phytochemicals in the evolution of lepidopteran male scents. In "Phytochemical Ecology: Allelochemicals, Mycotoxins and Insect Pheromones and Allomones," C.H. Chou and G.R. Waller (eds.). Academia Sinica, Taipei, Republic of China, pp. 401-418.

16. Baker, T.C. 1993. Learning the language of insects - and how to talk back. *Amer. Entomol.* 39:212-220.
17. Baker, T.C. and N.J. Vickers. 1994. Behavioral reaction times of male moths to pheromone filaments and visual stimuli: determinants of flight track shape and direction. In "Olfaction and Taste XI", K. Kurihara, N. Suzuki, H. Ogawa (eds.). Springer-Verlag, Tokyo. pp. 838-841.
18. Baker, T. C., Mafra-Neto, A., Dittl, T., and M. E. Rice. 1997. A novel controlled-release device for disrupting pheromone communication in moths. In: Witzgall, P., and Arn, H. (eds). *Proceedings IOBC wprs Symposium, Vol. 20(1)* "Technology Transfer in Mating Disruption. Montpellier 1996.
19. Todd, J. L., and T. C. Baker. 1997. The cutting edge of insect olfaction. *Amer. Entomol.* 43. 174-182.
20. Baker, T. C., A. Mafra-Neto, T. Dittl, and M. E. Rice. 1997. A novel controlled-release device for disrupting sex pheromone communication in moths. In "Technology Transfer in Mating Disruption" P. Witzgall and A. K. Minks (eds.), *IOBC wprs Bull.* 20: 141-149.
21. Todd, J. L. and T. C. Baker. 1999. Function of peripheral olfactory organs. In: Hansson, B.S. (ed.) *Insect Olfaction.* Springer-Verlag, Berlin. Pp. 67 - 96.
22. Baker, T. C., H. Y. Fadamiro, and A. A. Cossé. 1998. Widely-spaced, high-emission-rate pheromone sources suppress mating of European corn borer females. In. Zalucki, M. P., R. A. I. Drew, and G. G. White (eds.) *Pest Management, Future Challenges. Proc. Sixth Australasian Applied Entomological Research Conference.* University of Queensland Printery. pp. 279-288.
23. Baker, T. C. (2002) Mechanism for saltational shifts in pheromone communication systems. *Proc, Nat. Acad. Sci. USA.* 99: 13368-13370.
24. Hetling J.R., Myrick A.J., Park K.-C. & Baker T.C. (2003). Odor discrimination using a hybrid-device olfactory biosensor. *Proceedings of the 1st International IEEE Neural Engineering Meeting, Capri.*
25. Baker, T.C., and Heath, J.J. (2004) Pheromones – function and use in insect control. In: *Molecular Insect Science.* LI Gilbert, K Iatro, SS Gill (eds) Elsevier. Volume 6, pp. 407-460.
26. Myrick, A.J., Baker, T.C., Park, K.-C., and Hetling, J.R. (2005) Bioelectronic artificial nose using four-channel moth antenna biopotential recordings. *Proc. 2nd Internat. IEEE EMBS Conf. Neur. Eng.* 2005 pp. 313-316.
27. Hetling, J. R., Myrick, A. J., Park, K. C. and Baker, T.C. (2006) Hybrid olfactory biosensor using multichannel electroantennogram: design and application. In:

Handbook of Neural Engineering, Vol. II, Brain-Computer Interface. Metin Akay (ed.) IEEE Press, John Wiley, New York. Pp. 243 – 265.

28. Baker, T. C. (2008) Use of pheromones in IPM. *In* T. Radcliffe and B. Hutchinson (eds), *Integrated Pest Management*. Cambridge University Press. pp. 273-285.
29. Baker, T. C. (2010) Insect pheromones: Useful lessons for crustacean pheromone programs? *In* T. Breithaupt and M. Thiel (eds). *Chemical Communication in Crustaceans*. Springer Science+Business Media LLC. pp. 531-550.
30. Domingue, M. J., and Baker, T. C. (2012) A multi-disciplinary approach for developing tools to monitor invasive buprestid beetle species. *In*: *Invasive Species*, J. J. Blanco and A. T. Fernandes (eds). Nova Science Publishers, Inc. pp. 77-100. ISBN: 978-1-61942-761-7.
31. Hillier, N. K. and Baker, T. C. (2016) Pheromones of heliothine moths. *In* J. D. Allison and R. T. Cardé, (eds.) *Pheromone Communication in Moths: Evolution, Behavior, and Application*. University of California Press, pp. 301-333.
32. Baker, T. C., and Hansson, B. S. (2016) Moth sex pheromone olfaction: flux and flexibility in the coordinated confluences of visual and olfactory pathways. *In* J. D. Allison and R. T. Cardé, (eds.) *Pheromone Communication in Moths: Evolution, Behavior, and Application*. University of California Press, pp. 139-171.

Non-Refereed Research Publications

1. Cloonan, K. R., George, G. and Baker, T. C. (2014) Efforts to identify attractants to help control the fungus gnat, *Lycoriella mali*. **Mushroom News**. 62: 4 – 9.
2. Andreadis, S. S., Cloonan, K. R., and Baker, T. C. (2016) Progress in identifying the sex pheromone of the fungus gnat, *Lycoriella ingenua*, & other attractive substances. **Mushroom News**. 64: 4 – 13.

Invited Presentations (2004-2016)

Presented by T.C. Baker

2016.

1. January 12 – 16. Portland OR. Gave Keynote Address at the annual meeting of the Western Orchard Pest and Disease Management Conference. Lecture entitled: “Love at First Sniff: Harry Shorey and the Dawn of the Age of Pheromones”.
2. May 21 – 28. Alnarp, Sweden. ICE³ Celebration Symposium. Gave Keynote Address at the Celebration Symposium for the Linneaus Project called “Insect

Chemical Ecology, Ethology and Evolution” (“IC-E³”). Lecture entitled: “Optimizing Sex Pheromone Mating Disruption by Understanding Male Upwind Flight Behavior”.

3. June 24 – 28. Jena, Germany. Short course in Insect Chemical Ecology 16 (ICE16). Presented a lecture entitled “Chemically Mediated Behavior in Insects” and met with students during consultation periods to discuss topics of interest to them.
4. July 1 – 8. Iguassu Falls, Brazil. International Society of Chemical Ecology meeting. Chaired a symposium on the applied uses of semiochemicals and delivered a talk entitled: “A Method for Creating Highly Concentrated Odor Plumes Passively Emanating From Odor Dispensers”.
5. October 3. Mushroom Short Course, State College, PA. Delivered a talk entitled: “Zeroing In On the Precise Molecular Configuration of the Sex Pheromone of the Fungus Gnat, *Lycoriella ingenua*”.

2015.

1. June 16, 2015. Department of Chemical Ecology, Swedish Agricultural University, Alnarp, Sweden. Lectured in the Insect Chemical Ecology short course. Lecture entitled, “Chemically Mediated Behavior in Insects”.
2. June 29, 2015. Stockholm Sweden; International Society for Chemical Ecology. Gave invited lecture in the symposium on Chemical Neuroecology entitled, “Atomic Force Microscopy of Moth Trichoid Sensilla Across Species Reveals Common Themes and Specializations for Odorant Capture”.
3. September 21, 2015. Villasimius, Sardinia, Italy. 14th European Symposium on Insect Taste and Olfaction. Gave invited lecture in the symposium on Evolution of Olfaction entitled, “Specializations for Odorant Capture Revealed by Atomic Force Microscopy of Moth Trichoid Sensilla Across Species”.
4. September 26, 2015. Anaheim, California. Asia-Pacific Association of Chemical Ecologists. Gave an invited lecture in the symposium on practical uses of semiochemicals entitled: “Optimizing Sex Pheromone Mating Disruption by Understanding Male Upwind Flight Behavior”.
5. September 29, 2015. Kennett Square, Pennsylvania. Gave invited presentation at the annual Mushroom Short Course, entitled, “Mushroom Fly Research”.
6. November 15, 2015. Minneapolis, Minnesota. Delivered the 58th Annual Founders Memorial Address entitled, “Love at First Sniff: Harry Shorey and the Dawn of the Age of Pheromones”.
7. December 1st – December 9th. Harbin, China. Gave 7 lectures to the class in insect chemical ecology at the Northeast Forestry University. Also gave two departmental seminars to the faculty and students of Northeast Forestry University.

2014.

1. March 27, 2014. Department of Biology, Case Western Reserve University,

- Cleveland, Ohio. “Odorant Flux and Stimulus Strands: Some Thoughts About Multimodal Olfactory and Visual Processing in Insects.”
2. October 22, 2014. Department of Entomology, Chinese Academy of Forestry, Beijing, China. “Neuroethology of Insect Olfaction”.
 3. October 23, 2014. Department of Entomology, Chinese Academy of Forestry, Beijing, China. “Use of Pheromones in Integrated Pest Management”.
 4. October 24, 2014. Department of Entomology, Chinese Academy of Forestry, Beijing, China. “Techniques in Pheromone Research”.
 5. October 25, 2014. Nanchang, China. Presented a Plenary Lecture at the 10th meeting of the Chinese Association of Chemical Ecology: “Moth Sex Pheromone Olfaction: Flux and Flexibility in the Coordinated Confluences of Visual and Olfactory Pathways”.

2013.

1. March 14th, 2013. Served as the “Opponent” for a PhD defense at the Swedish Agricultural University, Alnarp, Sweden. Gave a 30 minute introductory seminar.
2. March 15th, 2013. Division of Chemical Ecology, SLU Alnarp, Sweden. “Odorant Flux: A Neuroethological Journey”.
3. April 29th, 2013. Selected for the honor of being the Griswold Lecturer for 2013. Presented the Griswold Lecture entitled, “Journey of a Cornell Undergraduate Entomology Major: Energized by the Passion of the 1960s’ Best and Brightest”.
4. June 11th, 2013. Max Planck Institute for Chemical Ecology, Jena, Germany. Invited lecturer at the “Schneiderhaus Celebration”. Lecture title: “Old Principles Live On in Neuroethological Studies of Moth Sex Pheromone Olfaction”.
5. August 12th, 2013. Pittsburgh, PA. Society of Invertebrate Pathology. “Attraction of female *Anopheles stephensi* mosquitoes to the spores of entomopathogenic and non-entomopathogenic fungi”.
6. August 23rd, 2013. Melbourne, Australia. International Society of Chemical Ecology/Asia-Pacific Association of Chemical Ecologists. “Advances in the Electroantennogram Technique For Use In Chemical Ecology Research”.
7. September 23rd, 2013. Villasimius, Sardinia, Italy. European Symposium on Insect Taste and Olfaction. “The Interactive Roles of Chemical and Visual Stimuli in the Mate-Finding and Mate-Selection Behaviors of the Emerald Ash Borer, *Agrilus planipennis*”.
8. October 1st, 2013. Natal, Brazil. Brazilian Society of Chemical Ecology. “Evolution of the Electroantennogram Technique and Its Uses In Chemical Ecology Research”.
9. October 8th, 2013. Lancaster, PA. Mushroom Short Course. “Identification of Semiochemical Cues Attractive to Mushroom Flies”.
10. October 22nd, 2013. Huck Institutes’ “Millenium Café” presentation. “Insect-inspired Biomimetic Design Against Agents of Harm”.
11. October 25th, 2013. PSU’s, Center for Brain, Behavior and Cognition “Lab of the Month” presentation. “Tom Baker Lab objectives: understanding insect olfaction and behavior for effective pest detection and control”.
12. November 13th, 2013. Austin, Texas. Annual Meeting of the Entomological Society of America. “Fatal Attraction of Malaria Mosquitoes to Fungal

Spores”.

2012.

1. July 20th, 2012. University of Würzburg, Würzburg, Germany. International Symposium on “Olfaction In Insects Under Debate: From Receptors to Behavior”. I was one of several “Invited Discussants”.
2. July 22 – 26, 2012. Vilnius, Lithuania. 28th Meeting of the International Society for Chemical Ecology, Presented the Silver Medal (Plenary) Address, entitled, “Everything’s In Flux: A Neuroethological Journey”.
3. August 22nd, 2012. Daegu, Korea. International Congress of Entomology, “Attraction of female *Anopheles stephensi* mosquitoes to the spores of entomopathogenic and non-entomopathogenic fungi”.
4. August 23rd, 2012. Daegu, Korea. International Congress of Entomology. “Working range of stimulus flux transduction determines dendrite size and number of pheromone component receptor neurons in moths”.
5. October 3-5, 2012. Max Planck Institute for Chemical Ecology, Jena, Germany. International Symposium “Ethomics: Asking the Organism in the Genomics Era” Was an “Invited Discussant”.
6. Nov. 30th -Dec. 1st, 2012. Max Planck Institute for Chemical Ecology, Jena, Germany. Invited Lecturer in “ICE 12, International Short Course in Insect Chemical Ecology”. Presented a 1.5 h lecture entitled, “Neuroethology of Insect Olfaction” and held a 2-hour-long evening discussion session with the 50 students attending the course.

2011.

1. Alnarp, Sweden. January 4, 2011. Swedish Agricultural University. PhD Thesis Defense Opponent for Martin Andersson. Lecture overview and discussion of his research.
2. Ames, Iowa. May 10, 2011. Dept. of Entomology, Iowa State University Seminar: “The interactive roles of chemical and visual stimuli in the mate-finding and mate-selection behavior of the emerald ash borer, *Agrilus planipennis*”.
3. Alnarp, Sweden. June 14, 2011. Swedish Agricultural University. Lectured to the short-course in Insect Chemical Ecology, entitled, “Neuroethology of insect olfactory-mediated behavior”.
4. Curitiba, Brazil. June 20 – 24, 2011. Department of Chemistry, Brazilian Federal University, Paraná. Presented the Plenary Lecture, plus 5 other lectures on “Neuroethological Studies of Insect Olfaction”, for the Winter Short Course in Insect Chemical Ecology.
5. Vancouver, British Columbia, Canada. July 25, 2011. Symposium lecturer. “The interactive roles of chemical and visual stimuli in the mate-finding and mate-selection behavior of the emerald ash borer, *Agrilus planipennis*”.
6. Penn State University. September 2, 2011. Dept. of Entomology seminar. “The interactive roles of chemical and visual stimuli in the mate-finding and mate-selection behavior of the emerald ash borer, *Agrilus planipennis*”.
7. Budapest, Hungary. September 20, 2011. Hungarian Institute of Plant Protection. “Neuroethology of moth pheromone olfaction”.
8. Beijing, China. October 10, 2011. USA-China Joint Symposium of the China-

US Research Center for Life Sciences on Insect Chemical Communication. One of 12 U.S. speakers. Presented a talk entitled, "Odorant flux ranges and the properties of insect olfactory receptor neurons".

9. Beijing, China. Annual meeting of the Asia-Pacific Association of Chemical Ecologists. Presented 2 lectures: "Remote detection and reporting of invasive insect species using satellite and internet communication". 2nd talk was entitled "Real-time odor discrimination and source location using a bioelectronic sensor array based on the insect electroantennogram".

2010.

1. University Park, PA, June 3rd and 4th, 2010. Presented two lectures in the Insect Chemical Ecology short course that I organized and oversaw. "Insect Neuroethology" and "Bad-Ass Bioassays"
2. Tours, France, August 3rd 2010. International Society of Chemical Ecology meeting. "Why most male ORNs are tuned to the most abundant pheromone components"
3. Jena, Germany. September 3rd, 2010. MPICE/CCE Mini-symposium that I co-organized and served as faculty travel guide. "Why most male ORNs are tuned to the most abundant pheromone components."
4. Shanghai, China, October 11, 2010. Plenary Lecture at the Chinese Association of Chemical Ecologists meeting. "Neuroethology of Sex Pheromone Olfaction".
5. Colonia del Sacramento, Uruguay, October 18th, 2010. Plenary Lecture at the 1st Meeting of the Latin American Association of Chemical Ecologists. "Neuroethology of Sex Pheromone Olfaction".
6. University Park, PA. November 4th, 2010. Department of Food Science, "Science Unwrapped" seminar series. "But Do We Shoot the Driver? Meeting New Challenges in Detecting Agents of Harm by Using Old Entomological Knowledge".
7. San Diego, CA. December 14th, 2010. Annual Meeting of the Entomological Society of America. "Semiochemical Successes and Failures: A Perspective".

2009.

1. Jena, Germany. January 24, 2009. Bill Hansson 50th Birthday Fest/Symposium at the Max Planck Institute for Chemical Ecology. "The cabbage looper olfactory receptor neuron story, with Bill Hansson through the ages".
2. Riverside, California. March 2, 2009. Department of Entomology Seminar series, University of California, Riverside: "But do we shoot the driver? Meeting new challenges in detecting agents of harm by using old entomological knowledge".
3. Davis, California. March 4, 2009. Department of Entomology Seminar series, University of California, Davis: "But do we shoot the driver? Meeting new challenges in detecting agents of harm by using old entomological knowledge".
4. Alnarp, Sweden. Presented two invited lectures for the Insect Chemical Ecology '09 short course (ICE09) at the Swedish Agricultural University at

Alnarp:

- 1) June 6, 2009: "Insect Pheromone-Mediated Behavior" and
- 2) June 8, 2009. "The Olfactory Sensillum and Physiology".
5. Neuchatel, Switzerland. 25th Annual meeting of the International Society of Chemical Ecology. August 25, 2009: "Focusing of pheromone molecules by trichoid sensillar cuticular lipid coatings".
6. Villasimius, Sardinia, Italy. September 23, 2009. European Symposium on Insect Taste and Olfaction: "Focusing of pheromone molecules by trichoid sensillar cuticular lipid coatings".
7. Tanka Village, Sardinia, Italy. September 27, 2009. European Congress for Research on Olfaction: "Focusing of pheromone molecules by trichoid sensillar cuticular lipid coatings".
8. Auburn, Alabama. October 12, 2009. Department of Entomology seminar series, Auburn University: "Detection: new opportunities for applying entomology's historic strengths in biomimetics".
9. Honolulu, Hawaii. October 29, 2009. Asia-Pacific Association of Chemical Ecologists: "Detection and location of distant odor sources using a bioelectronic sensor array based on the insect electroantennogram".
10. Kailua Kona, Hawaii. November 2, 2009. International Chemoreception Workshop on Insects: Focusing of pheromone molecules by trichoid sensillar cuticular coatings".

2008.

1. Syracuse, NY. March 11, 2008. Eastern Branch Meeting of the Entomological Society of America. (Invited Speaker). Symposium on Insect Imaging. "Atomic- and Chemical-Force Microscopy for Imaging Insect Nano-structures Related to Sensory Physiology".
2. Indianapolis, IN. April 1, 2008. Symposium by Insects Limited Inc. on Advanced Pheromone Uses and Monitoring. (Invited Speaker). "Practical Uses of Mating Disruption".
3. Alnarp, Sweden. June 25, 2008. Seminar Speaker (Invited Speaker) in the Department of Chemical Ecology, Swedish Agricultural University at Alnarp. "Examination of insect sensillar cuticular surfaces using atomic force and chemical force microscopy".
4. Penn State University. August 18, 2008. 25th Anniversary Meeting of the International Society of Chemical Ecology. (Invited Speaker). "Evidence for a nano-level "olfactory lens" found on individual male moth sensilla trichodea by using atomic force microscopy."
5. Portoroz, Slovenia. September 7, 2008. European Chemoreception Research Organization (ECRO). "Antennal Receptor Neurons of Mutant- and Normal-Strain *Trichoplusia ni* Male Moths Exhibit Differing Ratios of Response to Major and Minor Sex Pheromone Components"
6. Reno, NV. November 18, 2008. ESA National Meeting, (Invited Speaker). Symposium in honor of Wendell Roelofs. "Learning neuroethology in the Roelofs lab, ca. 1972."

2007.

1. Annapolis, MD, USA. January 10, 2007. USDA/APHIS 18th Interagency Research Form on Invasive Species. Invited Speaker. "Paratrooper copulation: the role of vision in mate-finding in emerald ash borer."
2. Alnarp, Sweden. June 12, 2007. Invited Lecturer in the two-week course in Chemical Ecology offered by the Swedish Agricultural University at Alnarp. Lecture Title: "Pheromones: Attraction, Controlled Flight, and Other Reactions".
3. Tsukuba, Japan, September 11, 2007. Asia-Pacific Association of Chemical Ecologists. Plenary Lecturer (Invited). "Balanced olfactory antagonism as a facilitator of evolutionary shifts in moth sex pheromone blends".
4. San Diego, California, December 10, 2007. Entomological Society of America. "Olfactory lens capabilities of cuticular lipid coatings on the sensilla trichodea of male *Helicoverpa zea* moths".

2006

1. Raleigh, North Carolina, June 6, 2006. USDA-APHIS/ARS Technology Development Workshop. "Remote Sensing Device for Detection and reporting of Invasive Species."
2. Bäckaskog, Sweden. May 16, 2006. CNS-MMX International Symposium. "Are there other odorant-class-related subclusters of gomeruli besides the MGC in the lepidopteran antennal lobe?"
3. Washington, D.C. June 14, 2006. Defense Threat Reduction Agency BioTech Workshop. "Moth Antennae for Discerning Bio-agents."
4. Barcelona, Spain. International Society of Chemical Ecology annual meeting. Symposium Organizer: Semiochemical Practical Approaches for Pest Control. Presented a symposium talk entitled: "Pros and cons of using high release-rate, low-density dispensers for mating disruption."
5. Granada, Spain. September 7, 2006. European Chemoreception Research Organization (ECRO) annual meeting. "Evidence for a Nano-Level "Olfactory Lens" Found on Individual Male Moth *Sensilla Trichodea* Using Atomic Force Microscopy"
6. Penn State University, October 12, 2006. Huck Institutes of the Life Sciences annual Crossover Symposium. "A tissue-based chemosensor for detecting and locating volatile molecules in nature."
7. Cincinnati, Ohio. October 31, 2006. USDA/ARS/APHIS Emerald Ash Borer-Asian Longhorned Beetle Joint Research Update. "Paratrooper copulation: the role of vision in mate-finding in emerald ash borer."
8. Geneva New York, Cornell University. November 9, 2006. Department of Entomology Seminar Series. "Evidence for a Nano-Level "Olfactory Lens" Found on Individual Male Moth *Sensilla Trichodea* Using Atomic Force Microscopy."
9. Erie, Pennsylvania. November 29, 2006. Joint Penn State Cooperative Extension/Pennsylvania Department of Agriculture meeting on the Multicolored Asian Lady Beetle. "Insect pheromones and pheromone-mediated behavior."
10. University of Vienna, Vienna, Austria. November 17, 2006. International Symposium: "New Frontiers in Neurobiology". Presented a talk entitled: "Odor-mediated behaviour."

11. Indianapolis, Indiana. December 12, 2006. ESA Annual Meeting. Symposium on “Applied Insect Chemical Ecology. “Key breakthroughs in chemical ecology of agricultural pests and practical applications for crop management.”

2005

1. Alnarp, Sweden. March 11, 2005. Invited Lecturer in the two-week course in Chemical Ecology offered by the Swedish Agricultural University at Alnarp. Lecture Title: “Pheromones”.
2. Harrisburg, PA. March 21, 2005. Delivered the Plenary Address (After-Dinner Banquet Address) at the Annual Meeting of the Eastern Branch of the Entomological Society of America. Title: “Science with practice: neuroethology of insect pheromone olfaction”.
3. Geneva, New York. April 15, 2005. Presented an invited seminar to the Department of Entomology at Cornell University’s N.Y. St. Agr. Exp. Sta. Title: “Heliothine moth olfaction: pheromone receptor neurons of hybrid male *Heliothis subflexa* X *Heliothis virescens*”
4. Raleigh, North Carolina. April 25, 2005. Presented an invited seminar to the Department of Entomology at N.C. State University. Title: “Malleability of moth sex pheromone receptors: insights gained through neuroethological studies of heliothine moths”.
5. Washington, D. C. July 25, 2005. Organized and chaired a symposium and gave an invited presentation at the 21st Annual Meeting of the International Society of Chemical Ecology. Title: “Heliothine moth olfaction”.
6. Wooster, Ohio October 11, 2005. Invited Speaker at the Department of Entomology, OARDC, Ohio State University, Wooster, Ohio. Presented two talks.

Title #1: “Insights into moth pheromone receptor expression gained through neuroethological studies of heliothine moths”.

Title #2: “Odor source discrimination and location using an insect antennal-based hybrid biosensor”.
7. Penn State University, October 14, 2005. Gave an invited presentation in the annual Crossover Meeting of the Huck Institutes of The Life Sciences and The Materials Research Institute. Title: “Odor source discrimination and location using an insect antennal-based hybrid biosensor”
8. Cheju, Korea, October 18, 2005. Organized and chaired a symposium and gave an invited talk at the 5th Meeting of the Asia-Pacific Association of Chemical Ecologists. Title: “Heliothine moth olfaction”.
9. Penn State University, November 14, 2005. Invited seminar presented in the Department of Agricultural and Biological Engineering’s weekly seminar series. Title: “Odor discrimination using insect antennae”.

2004

1. Athens, Georgia. February 23, 2004. University of Georgia Entomology Department Seminar Series. Gave an invited talk entitled “Science With Practice: Chemical Ecology and Applied Neuroethology”.

2. Seewiesen, Germany. March 16, 2004. Max Planck Institute at Seewiesen. Gave an invited talk entitled "Neuroethological and Applied Neuroethological Aspects of Moth Sex Pheromone Olfaction".
3. Jena, Germany, March 20, 2004. Max Planck Institute for Chemical Ecology. Gave an invited talk entitled "Neuroethological and Applied Neuroethological Aspects of Moth Sex Pheromone Olfaction".
4. Turrialba, Costa Rica, March 24, 2004. Workshop at CATIE concerning Semiochemicals and Microbial Antagonists: Their Role in Integrated Pest Management in Latin America. Gave an invited talk entitled: "Mating disruption of several lepidopterous pests using high emission rate and low point source dispensers."
5. Penn State University, Department of Entomology, April 8, 2004. "Malleability of Moth Sex Pheromone Antennal Receptor Neurons."
6. Ottawa, Ontario, Canada, July 23-29 2004. International Society of Chemical Ecology Annual Meeting.
7. Brisbane, Australia, XXII International Congress of Entomology, August 15-21, 2004. "Mating Disruption of Several Lepidopterous Pests Using High-emission-rate, Widely Spaced Dispensers."
8. Entomological Society of America, Salt Lake City, Utah. November 13-18, 2004, AIENA Symposium: "Sex Pheromone Mating Disruption: Commercial Opportunities and Challenges."

TEACHING ACTIVITIES

1981-1992, University of California, Riverside.

Developed and taught a graduate/upper level undergraduate course in Insect Behavior yearly to 10-15 students (except my sabbatic year, 1987). This course was very well-received and typically had among the highest student evaluations in the Department of Entomology at UC Riverside. It was the basis for my receiving the Distinguished Teaching Award from the Pacific Branch of the Entomological Society of America in 1983 and 1984.

Taught a seminar course in Special Topics in Insect Behavior every year to 6-12 students.

2000-2002, Iowa State University.

My yearly graduate/upper-level undergraduate course in Insect Behavior was re-initiated following my stepping down as Chair of the Department of Entomology and my return to the regular ranks of the faculty. Again this course was well-received, with an enrollment of 10 students in 2000, 6 in 2001, and 21 enrolled in 2002.

I also taught a Special Topics seminar course in Chemical Ecology twice.

2005-Present, Penn State University.

I began teaching a graduate/upper-level undergraduate course entitled Insect Behavior and Ecology every Fall semester since 2005. Enrollment was 9 students in 2005, and 7 students in 2006, and has continued to have an enrollment averaging 7

students each year. In 2011, the course was newly titled, “Sensory Biology of Insects”, and the content changed to focus more on neuroethological studies relating to sensory physiology that results in behavioral responses. I taught this course each year in Spring Semester from 2011-2014, and then again in 2016, after the Department of Entomology gave it an “every-other-year” designation. In 2012, Jim Tumlinson and I also began teaching a graduate-level course in Insect Chemical Ecology during Fall Semester (enrollment, 9 students). It has been taught every other year since then in the fall (2014 and 2016).

TECHNOLOGY TRANSFER FOR CHEMICAL ECOLOGY

I formed an insect semiochemicals company called MSTRS Technologies, Inc. in November, 1998, and served as President and CEO of this company.

MSTRS Technologies, Inc. owned the exclusive license to the ladybeetle/lacewing attractant (U.S. Patent No. 6,562,332. “Attractants of Beneficial Insects” T.C. Baker, J. J. Obrycki, J.W. Zhu, Inventors) and developed products to enhance biological control of aphids in gardens, which was sold by Gardens Alive! as the product, ‘**Benallure**’.

MSTRS Technologies, Inc., developed a novel controlled release dispenser system for disrupting mating of moth pests that received EPA registration for mating disruption products against four pest species: two pests of cranberries (blackheaded fireworm and sparganothis fruitworm), one pest of peaches and apples (Oriental fruit moth), and another pest, the European corn borer, on corn. This dispenser system also received approval for organic farming practices from the Organic Materials Review Institute, Eugene, Oregon. Working with BASF personnel, I helped develop this high-release-rate, low dispenser density system into the EPA-registered product, “**Allure MD**”, for use against five species of stored products insects infesting grain storage warehouses. It is now being sold by BASF and successfully used in warehouses across the U.S.

The Baker group also patented a novel attractant blend for vinegar flies (*Drosophila spp.*)(U.S. Patent No. 6,543,181. “Attractant Blend for *Drosophila* Fruit Flies”. T. C. Baker, J.W. Zhu, K.C. Park, Inventors) and worked with Whitmire Micro-Gen, Inc. (now part of BASF) to develop a new *Drosophila* attractant/trapping system that currently is sold by BASF to pest control operators at a volume of ca. 1 million units per year. This trap, the “**Vector 960**” is considered to be the industry standard for vinegar fly trapping and control. Even though it is a professional product and not for sale via retail outlets, it can now (surprisingly) be found for sale on the internet and routinely receives favorable reviews. The Baker laboratory also identified and patented a novel attractant blend for houseflies (U. S. Patent No. 6,106,821 August 22, 2000. “Fly Attractant Compositions”, T. C. Baker and A. A. Cossé, Inventors).