

CURRICULUM VITAE

YUNFAN ZOU

Research Specialist, Department of Entomology
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Education

- Ph.D. Organic Chemistry, Duke University, Durham NC, 2006
Dissertation: Preparation of 1-Substituted Cyclopropenes as Ethylene Antagonists and Elucidation of the Mechanism of Ethylene Binding in the Ethylene Receptor
Thesis Advisor: Professor Michael C. Pirrung
- M.S. Organic Chemistry, Tsinghua University, Beijing, P. R. China, 2000
Thesis: Synthesis of Difluorobenzonitrile Liquid Crystals with Large Positive Dielectric Anisotropy and Studies of Their Properties
Thesis Advisor: Professor Shouyi Xu
- B.S. Chemistry, Tsinghua University, Beijing, P. R. China, 1997

Research Experience

April 2012 – Present: *Research Specialist*

April 2007 – March 2012: *Postdoctoral Scholar*

Department of Entomology, University of California, Riverside (Supervisor: Professor Jocelyn G. Millar)

Conduct leading edge research on insect semiochemistry and chemical ecology, specifically synthesis of newly discovered pheromones, both to confirm identifications and to provide sufficient material for field tests. Play a key role in developing practical applications of pheromones for integrated pest management.

- **Research Objectives**

- Elucidate the role of chemical signals as mediators of insect behavior
- Develop practical applications of pheromones for integrated pest management

- **Research Highlights**

- Developed syntheses of insect pheromones for important agricultural pests including avocado seed moth, grape mealybug, longtailed mealybug, obscure mealybug, cerambycid beetles, and red-shouldered stink bug. These pheromones were prepared in multi-gram scale through multi-step synthesis, and have now been commercialized for insect detection and monitoring.

2000 – 2006: *Graduate Research Assistant*

Department of Chemistry, Duke University (Advisor: Professor Michael C. Pirrung,

relocated with advisor to University of California, Riverside in 2005 and employed as junior specialist)

Conducted research on receptor of important plant hormone ethylene: synthesized a variety of novel 1-substituted cyclopropenes as effective ethylene antagonists, provided a structural model for the resting, dimeric form of the ethylene receptor, and put forward a novel proposal for the mode of action of cyclopropene ethylene antagonists.

Publications

Zou, Y.; Rojas-Pierce, M.; Raikhel, N. V.; Pirrung, M. C. Preparation of methyl ester precursors of biologically active agents. *BioTechniques* **2008**, *44*, 377.

Pirrung, M. C; Bleecker, A. B.; Inoue, Y.; Rodriguez, F. I.; Sugawara, N.; Wada, T.; **Zou, Y.;** Binder, B. M. Ethylene receptor antagonists: strained alkenes are necessary but not sufficient. *Chemistry & Biology* **2008**, *15*, 313.

Millar, J. G.; Hoddle, M.; McElfresh, J. S.; **Zou, Y.;** Hoddle, C. (9Z)-9,13-Tetradecadien-11-ynal, the sex pheromone of the avocado seed moth, *Stenoma catenifer*. *Tetrahedron Letters* **2008**, *49*, 4820.

Zou, Y.; Millar, J. G. Synthesis of the pheromone of the longtailed mealybug, a sterically congested, irregular monoterpenoid. *Journal of Organic Chemistry* **2009**, *74*, 7207.

Hoddle, M. S.; Millar, J. G.; Hoddle, C. D.; **Zou, Y.;** McElfresh, J. S. Synthesis and field evaluation of the sex pheromone of *Stenoma catenifer* (Lepidoptera: Elachistidae). *Journal of Economic Entomology* **2009**, *102*, 1460.

Zou, Y.; Millar, J. G. Improved synthesis of (9Z)-9,13-tetradecadien-11-ynal, the sex pheromone of the avocado seed moth, *Stenoma catenifer*. *Tetrahedron Letters* **2010**, *51*, 1336.

Surpin, M.; **Zou, Y.;** Xiong, C.; Raikhel, N. V.; Pirrung, M. C. Iodine scanning of a phenazine inhibitor of vacuolar sorting. *Bioorganic & Medicinal Chemistry Letters* **2010**, *20*, 1496.

Zou, Y.; Daane, K. M.; Bentley, W. J.; Millar, J. G. Synthesis and bioassay of racemic and chiral *trans*- α -necrotyl isobutyrate, the sex pheromone of the grape mealybug *Pseudococcus maritimus*. *Journal of Agricultural and Food Chemistry* **2010**, *58*, 4977.

Zou, Y.; Millar, J. G. Improved synthesis of the pheromone of the longtailed mealybug. *Synlett* **2010**, 2319.

Hoddle, M. S.; Millar, J. G.; Hoddle, C. D; **Zou, Y.;** McElfresh, J. S.; Lesch, S. M. Field optimization of the sex pheromone of *Stenoma catenifer* (Lepidoptera:Elachistidae): evaluation of lure types, trap height, male flight

distances, and number of traps needed per avocado orchard for detection. *Bulletin of Entomological Research* **2011**, *101*, 145.

Zou, Y.; Millar, J. G. Stereoselective synthesis of the obscure mealybug pheromone by hydrogenation of a tetrasubstituted alkene precursor. *Tetrahedron Letters* **2011**, *52*, 4224.

Hughes, G. P.; **Zou, Y.**; Millar, J. G.; Ginzel, M. D. (*S*)-fusicumol and (*S*)-fusicumol acetate produced by a male *Astyleiopus variegatus* (Coleoptera: Cerambycidae). *The Canadian Entomologist* **2013**, *145*, FirstView Article (Published online: 29 January 2013).

Zou, Y.; Chinta, S. P.; Millar, J. G. Irregular terpenoids as mealybug and scale pheromones: chemistry and applications. Invited book chapter, ACS Symposium Series. **2013**, in press.

Presentations

Invited Presentations

Jocelyn G. Millar, J. Stephen McElfresh, Yunfan Zou, Kent Daane, Walt Bentley, and Rebeccah Waterworth. Pheromones of mealybugs: moving from discovery to practical applications. Invited symposium presentation. Entomological Society of America Pacific Branch Annual Meeting, Boise, ID, United States, April 11-14, 2010.

Jocelyn G. Millar, Yunfan Zou, Jardel Moreira, and J. Stephen McElfresh. Sex pheromones of grape, vine, longtailed, and obscure mealybugs: unique terpenoids with valuable practical applications. Invited symposium presentation. Joint meeting of the 12th International Union of Pure and Applied Chemistry, International Congress of Pesticide Chemistry, and the Royal Australian Chemical Institute 13th National Convention, Melbourne, Australia, July 4-8, 2010.

Jocelyn G. Millar, Yunfan Zou, J. Stephen McElfresh, Kent Daane, and Walt Bentley. Practical applications of mealybug pheromones. Invited speaker, Departamento de Sanidad Vegetal, Santiago, Chile, October 13, 2010.

Jocelyn G. Millar, Yunfan Zou, J. Stephen McElfresh, Bruno Figadere, Jardel Moreira, Kent Daane, and Walt Bentley. Chemistry and applications of mealybug pheromones. Invited plenary lecture. Latin American Association of Chemical Ecology, Colonia del Sacramento, Uruguay, October 17-20, 2010.

Yunfan Zou, Jocelyn G. Millar, J. Stephen McElfresh, Jardel Moreira. Chemistry and applications of terpenoid pheromones of mealybugs. Invited presentation for the American Chemical Society's Spencer award symposium honoring award winner Clive Hendrick. 241st ACS National Meeting, Anaheim, CA, United States, March 27-31, 2011.

Jocelyn Millar, Yunfan Zou, Bruno Figadere, Jardel Moreira, J. Steven McElfresh, Rebeccah Waterworth, Kent Daane, and Walt Bentley. Pheromones of Mealybugs.

Invited departmental seminar, Department of Pharmacology, Université Paris Sud, Paris, France, July 11, 2012.

Yunfan Zou, Jocelyn G. Millar, Satya Chinta. Highly Irregular Terpenoids as Mealybug Pheromones: Chemistry and Applications. Invited presentation for the American Chemical Society's Natural Products for Pest Management symposium, 244th ACS National Meeting, Philadelphia, PA, United States, August 19-23, 2012.

Submitted Presentations

Yunfan Zou, Michael C. Pirrung, Erika Hensley. Efficient preparation of 1-alkylcyclopropenes as antagonists of the ethylene receptor. Poster presentation. 55th Southeast Regional Meeting of the American Chemical Society, Atlanta, GA, United States, November 16-19, 2003.

Jocelyn Millar, Mark Hoddle, J. Stephen McElfresh, Yunfan Zou, and Christina Hoddle. Proactive chemical ecology: identification of a novel dienynal structure as the sex pheromone of an invasive pest species, the avocado seed moth, *Stenoma catenifer*. Oral presentation. International Society of Chemical Ecology 24th Annual Meeting, State College, PA, United States, August 17-22, 2008.

Jocelyn Millar, Yunfan Zou, Jardel Moreira, Bruno Figadere, J. Stephen McElfresh, Kent Daane, and Walt Bentley. Recent advances in the chemistry and applications of mealybug pheromones. Oral presentation. International Society of Chemical Ecology 26th Annual Meeting, Tours, France, July 31-August 4, 2010.

Gabriel P. Hughes, Yunfan Zou, Jocelyn G. Millar and Matthew D. Ginzel. (*S*)-fusicumol and (*S*)-fusicumol acetate produced by a male *Astyleiopus variegatus* (Coleoptera: Cerambycidae). Oral presentation. Entomological Society of America Northeastern Branch Annual Meeting, Rapid City, SD, United States, June 16-19, 2013.

Referee Experience

Referee for *Journal of Agricultural and Food Chemistry*, *Synthesis*, and *Psyche: A Journal of Entomology*

Membership in Professional Associations

American Chemical Society