

STATE OF CALIFORNIA
STANDARD AGREEMENT
 STD 213 (Rev 06/03)

| |
|---------------------------------------|
| AGREEMENT NUMBER 14-C0102 |
| REGISTRATION NUMBER 1418364 |

1. This Agreement is entered into between the State Agency and the Contractor named below:

STATE AGENCY'S NAME

Department of Pesticide Regulation

CONTRACTOR'S NAME

The Regents of the University of California, on Behalf of Its Riverside Campus

2. The term of this Agreement is: May 1, 2015 or upon final approval by the State, whichever occurs later, through April 15, 2017

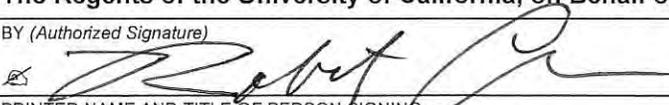
3. The maximum amount of this Agreement is: **\$149,991.00**
One hundred forty-nine thousand nine hundred ninety-one dollars and no cents

4. The parties agree to comply with the terms and conditions of the following exhibits which are by this reference made a part of the Agreement.

| | |
|--|---------|
| Exhibit A – Scope of Work | 9 Pages |
| Exhibit B – Budget Detail and Payment Provisions | 4 Pages |
| Exhibit C* – General Terms and Conditions (GIA 610) | |
| Exhibit D – Special Terms and Conditions | 2 Pages |
| Exhibit E – Additional Terms and Conditions | 1 Page |
| Exhibit F – Curriculum Vitae | 9 Pages |

Items shown with an Asterisk (*), are hereby incorporated by reference and made part of this agreement as if attached hereto. *These documents can be viewed at <http://www.ols.dgs.ca.gov/Standard+Language/default.htm>*

IN WITNESS WHEREOF, this Agreement has been executed by the parties hereto.

| CONTRACTOR | | California Department of General Services Use Only |
|--|---------------------------------------|---|
| CONTRACTOR'S NAME (if other than an individual, state whether a corporation, partnership, etc.) The Regents of the University of California, on Behalf of Its Riverside Campus | | |
| BY (Authorized Signature)  | DATE SIGNED(Do not type) 5/20/2015 | |
| PRINTED NAME AND TITLE OF PERSON SIGNING Robert Chan, Principal Contract & Grant Officer | | |
| ADDRESS 200 University Office Blvd., University of California, SPA, Riverside, CA 92521 | | |
| STATE OF CALIFORNIA | | |
| AGENCY NAME Department of Pesticide Regulation | | |
| BY (Authorized Signature)  | DATE SIGNED(Do not type) 5/28/15 | |
| PRINTED NAME AND TITLE OF PERSON SIGNING Lu Saepanh, Chief, Fiscal Services and Business Operations | | |
| ADDRESS 1001 I Street, Sacramento, CA 95814 | | |

Exempt per: Delegation Letter 74.5

SCOPE OF WORK

1. This Agreement is between the Regents of the University of California, UC Riverside (UCR) through Drs. Les Greenberg (PI), Michael K. Rust (co-PI), and Dong-Hwan Choe (co-PI), Department of Entomology, and Dr. Jay Gan (co-PI), Department of Environmental Sciences, hereinafter referred to as Contractor, and the Department of Pesticide Regulation (DPR), hereinafter referred to as DPR.
2. This Agreement will commence on the start date May 01, 2015 as presented herein or upon final approval by the State, whichever is later and no work shall begin before that time. This Agreement is of no effect unless approved by the State. Contractor shall not receive payment for work performed prior to the approval of the Agreement and before receipt of notice to proceed by the Contract Manager. This agreement shall expire on April 15, 2017. The services shall be provided during normal working hours.
3. The Project Representatives during the term of this Agreement will be:
 - A. All official communications, except invoices, from the Contractor to DPR shall be directed to the attention of the DPR Contract Manager, **Michael Ensminger**, Ph.D., or designee at:

Department of Pesticide Regulation
Environmental Monitoring Branch, MS 3-B
1001 I Street
P.O. Box 4015
Sacramento, CA 95812-4015
Phone 916-324-4186; Fax (916) 324-4405
Email address: mensminger@cdpr.ca.gov

- B. All invoices from the Contractor to DPR shall be directed to:

Department of Pesticide Regulation
Attn: Accounts Payable
P.O. Box 4015, MS 4A
Sacramento, CA 95812-4015

- C. All programmatic communications from DPR to the Contractor shall be directed to the attention of **Dr. Les Greenberg** or designee at:

Dr. Les Greenberg
Department of Entomology, UC Riverside, CA 92521
Phone: 951-827-3217; Fax: (951) 827-3086
Email: Les.greenberg@ucr.edu

EXHIBIT A STANDARD AGREEMENT

D. All fiscal communications from DPR to Contractor shall be directed to:

Fred DeVera, Extramural Funds Manager
Regents of the University of California,
Riverside Accounting Office - 002 Riverside, CA 92521
Phone: (951) 827-1948; Fax: (951) 827-3314
Email Address: Fred.DeVera@ucr.edu

E. The Project Representatives during the term of this Agreement may be changed by mutual written agreement without the necessity of formal amendment to this Agreement.

4. Contractor Responsibilities

UCR agrees to perform the services listed below. Title of Contract will be "Research to Reduce Fipronil Runoff into Urban Surface Waters"

A. Background and Goals

Recent monitoring has shown that California urban creeks are commonly contaminated with numerous urban-use pesticides. Creeks may become contaminated during irrigation or storm water runoff. Insecticides in these waters are a concern due to their high level of potential toxicity to aquatic organisms. As chlorpyrifos and diazinon urban use, and corresponding detections in urban surface waters have decreased, an increase in pyrethroids, fipronil, and imidacloprid use and detections in urban surface waters has occurred. Fipronil has become increasingly scrutinized as more and more research has shown that fipronil, and fipronil degradates, are frequently detected in urban surface waters at concentrations that are potentially toxic to sensitive aquatic organisms.

Mechanisms by which fipronil enter urban waters are not well understood; management practices aimed at reducing fipronil runoff via reducing use and subsequent effect on bioefficacy are also not well understood. Some recent work has shown that fipronil runoff from urban homes may be mitigated by restricting where it is applied (e.g., limiting foundation applications at the garage door/driveway interface) or by altering how it is applied (using pin stream or crack and crevice applications), but data is limited due to difficulties in obtaining large sample sizes with *in situ* (on-site) home studies and/or producing replicated studies.

Additional research on fipronil urban runoff (how it occurs, best management practices to reduce or prevent runoff, and effect of these best management practices on ant [and other insect pest] bioefficacy) is needed. Especially important is obtaining sufficient sample size or conducting research studies under controlled conditions with replicated data to allow for statistical analysis with sufficient power to make results meaningful. The goals of this work are to further characterize various mitigation methods aimed at reducing the total amount of fipronil that runs off urban homes into urban waters. For mitigation methods that reduce or alter the amount of fipronil applied, a corresponding effect on control will also be investigated.

B. Work to Be Performed

Overview: The Contractor will perform research to evaluate fipronil runoff in two different trial settings, with the goal of determining application methods to reduce fipronil runoff into surface waters while maintaining bioefficacy. The contractor will conduct two different types of trials:

- 1) Initial or "screening" trials. The contractor will evaluate fipronil runoff from a constructed wall with an abutting sloping cement pad ("fabricated wall"). The wall and pad are designed to simulate a house and adjacent concrete driveway which would normally carry runoff to the street. The contractor will evaluate numerous methods to reduce fipronil runoff (Task 1); and,
- 2) Secondary or "on-site" trials. From the two most likely or promising screening trials (at a minimum), the contractor will conduct research at individual homes in the Riverside area. Fipronil runoff and ant bioefficacy will be determined (Task 2).

Task 1. Field Trials on Fabricated Wall

Using the fabricated wall constructed under contract 11-C0086, the contractor will conduct replicated trials to characterize the runoff of fipronil using different application methods. The trials will meet the following guidelines. The contractor will:

- 1) Use experimental application methods described below (see Application methods);

- 2) Use irrigation practices typical of urban homes in the Riverside area to generate runoff;
- 3) Collect runoff at the end of the concrete pad;
- 4) Quantify the amount and/or concentration of fipronil and fipronil breakdown products (sulfone, sulfide, amide, desulfinyl) in the runoff water;
- 5) Compare experimental applications to the standard California labeled application method (application to foundations 12 inches up [vertical] and 12 inches out [horizontal]); and,
- 6) Perform sufficient replication to allow for statistical analysis with sufficient power to make results meaningful (> three replications per treatment).

Application methods

To reduce fipronil runoff, as resource allows, the contractor will test the following (reduced) application methods:

- 1) Foundation applications listed below in the following table (Treatment A is the labeled rate, for comparison to experimental [other] treatments);

| Application spray swath ^A | Spray volume | Area treated (square feet [ft ²]) (Based treating 160 linear feet) ^B | Purpose |
|--|--|--|---|
| A. One (1) foot up and one (1) foot out (labeled) | 2 quarts (64 fluid ounces [fl oz.]) of a 0.06% Termidor SC finished dilution (labeled rate ^B) | 320 ft ² (labeled area treated, equals 0.2 fl oz. per ft ²) | Labeled application rate |
| B. One inch up and one inch out using pin stream application | ~ 5.34 fl oz. of a 0.06% Termidor SC finished dilution | ~ 26.67 ft ² (0.2 fl oz. per ft ²) | Very narrow band, reduced fipronil mass |
| C. One inch up and one inch out using pin stream application | ~ One quart (32 fl oz.) of a 0.06% Termidor SC finished dilution (or as practical for the reduced area but applying a higher total volume than in B) | ~26.7 ft ² (2.4 fl oz. per ft ²) | Very narrow band, similar fipronil mass similar to labeled rate |
| D. Four to six (4-6) inches up and four to six (4-6) inches out | ~ One quart (32 fl oz.) of a 0.06% Termidor SC finished dilution | ~ 106.7 – 160 ft ² (0.2 - 0.3 fl oz. per ft ²) | Narrow band, reduced fipronil mass |
| E. Four to six (4-6) inches up and four to six (4-6) inches out | ~ Two quarts (64 fl oz.) of a 0.06% Termidor SC finished dilution | ~ 106.7 – 160 ft ² (0.4 – 0.6 fl oz. per ft ²) | Narrow band, similar to labeled fipronil mass |
| F. Reduced applications to the garage door/driveway interface. Will include spot treatments to the driveway edge the driveway with the garage door | For a 2 ft ² spot treatment, ~0.4 fl oz. of a 0.06% Termidor SC finished dilution | ~ Two areas of 2 ft ² (0.2 fl oz. per ft ²) (spot treatment along driveway edge, maximum 1 foot out from garage door) | Reduced fipronil mass in front of driveway |
| | To be determined (less than 2 quarts (64 fl oz.) of a 0.06% Termidor SC finished dilution) | TBD (less than 320 ft ² [less than 0.2 fl oz. per ft ²]) | Reduced fipronil mass in front of driveway |

| | | |
|---|---|---|
| <p>G. No applications to the garage door/driveway interface</p> | <p>None at the garage door/driveway interface; labeled rate of spray Termidor SC finished dilution and application methods to remainder of foundation areas</p> | <p>Reduced fipronil mass in front of driveway</p> |
| <p>^A In all applications, application will be along the foundation exterior perimeter, or equivalent on the fabricated wall. ^B Labeled rate, 0.4 fl oz. of Termidor® SC Termiticide/Insecticide to two (2) quarts (64 fl oz.) to obtain a 0.06% spray Termidor SC finished dilution. Based on treating 160 linear feet, as described in the Termidor® SC Termiticide/Insecticide label</p> | | |

- 2) With resource, permitting, other management tools and strategies to reduce the amount of fipronil runoff (as spot treatments, chemical baits, natural products, botanicals, or other practices to reduce the total mass of fipronil applied). Other management strategies cannot include the use of pyrethroid or organophosphate insecticides as an alternative insecticide. Any insecticide products used in conjunction with fipronil sprays (to reduce the amount of fipronil applied) have to be California registered products for use in or around urban homes.

Fipronil runoff in water will be collected and analyzed at 0 – 5 and 25 - 35 days after treatment (DAT). All treatments will use the labeled Termidor SC finished dilution rate of 0.06% (e.g., 0.8 fluid ounce of Termidor® SC Termiticide/Insecticide to 1 gallon of water), based on the current California fipronil label Termidor® SC Termiticide/Insecticide as listed under the “Directions for use to control listed pests on outside surfaces and along foundation perimeter of listed structures/Mixing Instructions” (label page 18). Any exception to the 0.06% Termidor SC finished dilution must be agreed on between the Contract Manager and the Contractor (via mail). Termidor® SC Termiticide/Insecticide is selected as the default fipronil product because currently it has overwhelming use for foundation exterior perimeter applications of fipronil in California. Current Termidor® SC Termiticide/Insecticide can be provided by DPR.

For definitions of application methods, the contractor will use Title 3, California Code of Regulations and the DPR Enforcement Compendium found at <http://www.cdpr.ca.gov/docs/enforce/compend.htm>, http://www.cdpr.ca.gov/docs/enforce/compend/vol_8/pestlaw.htm, <http://www.cdpr.ca.gov/docs/legbills/calcode/010101.htm#a6000> and <http://www.cdpr.ca.gov/docs/legbills/calcode/040501.htm#a6970>. Spot treatments are areas not to exceed two 2 square feet.

Task 2. Riverside on-site home study

Based on the results of the screening trials in Task 1, the contractor will conduct on-site research trials at homes in the Riverside area to determine how changing application methods affect fipronil/degradate runoff and ant bioefficacy. Specifically, the contractor will:

- 1) Select a minimum of two promising application methods to reduce fipronil runoff from the experimental trials conducted in Task 1;
- 2) Perform sufficient replication to allow for statistical analysis with sufficient power to make results meaningful (for runoff, \geq five homes per treatment; for ant efficacy, 10 -15 homes per treatment);
- 3) Collect runoff water in the street coming from each individual home;
- 4) Analyze the runoff water for fipronil and degradates at 0 – 5 and 25 - 35 DAT; and,
- 5) Determine what affect the application method has on ant control by evaluating ant numbers at 1-2, 4, 8-10 weeks after treatment.

Task 3. Reporting

The contractor will:

- 1) Compare the concentration of fipronil and fipronil degradates (where they exist) in the runoff water to US EPA Aquatic Life Benchmarks and to a sensitive aquatic species (as *Chironomus dilutus* EC₅₀ values);
- 2) Provide two annual update reports at year end (Dec 2015, Dec 2016);
- 3) Present one seminar to DPR, nearer to the end of the study. The seminar can be presented at DPR in Sacramento, CA or at a DPR-sponsored conference (agreed upon by the Contractor and by the DPR Contract Manager);
- 4) Submit a final report of the study results to DPR 15 days before completion of the contract.

TIMELINE and TASKS (Table 1)

- 1) Summer 2015 – Summer 2016. Conduct replicated, field insecticide runoff trials on fabricated wall;
- 2) Spring 2016 – Fall 2016. Riverside home trials. Conduct trials at homes in Riverside area;
- 3) Year-end reports. Fall 2015; Fall 2016
- 4) Seminar and Final Report. Winter, spring 2017

Table I - Task list.

| | FY 2014 /15 | FY 2015-2016 | | | | FY 2016-2017 | | | |
|---|-------------------|--------------|------|-------------|--------|--------------|------|-------------|--------|
| Year: | 2015 | | | 2016 | | | 2017 | | |
| Activities/Tasks | Spring | Sum- mer | Fall | Win- ter | Spring | Sum- mer | Fall | Win- ter | Spring |
| 1.Runoff characterization – field trials with constructed wall ¹ | | X | X | X | X | X | | | |
| 2. Riverside home-sites trials | | | | | X | X | X | | |
| 3. Reporting | | | | | | | | | |
| 3.2) Year-end status reports | | | X | | | | X | | |
| 3.3) Seminar to DPR | | | | | | | | X | X |
| 3.4) Final report | | | | | | | | | X |

5. DPR Responsibilities

- A. DPR will provide review and approval of study report within 30 days of submission.
- B. DPR will arrange a room for a seminar given at DPR in Sacramento, CA.
- C. DPR will provide prompt payment of invoices.

EXHIBIT B
Standard Agreement

BUDGET DETAIL AND PAYMENT PROVISIONS

1. Invoicing

- A. For services performed according to the attached Scope of Work and the terms of this Agreement, and upon receipt of the invoices, DPR agrees to compensate Contractor, in arrears, for actual allowable costs incurred as specified herein and in accordance with the rates specified herein or attached hereto. Incomplete or disputed invoices shall be returned to Contractor, unpaid, for correction.
- B. Invoices shall be itemized in accordance with the Rates contained in this Exhibit, include the Agreement Number, and shall be submitted in triplicate, not more frequently than monthly or less than quarterly in arrears, to:

Department of Pesticide Regulation
Attn: Accounts Payable
P.O. Box 4015, MS-4A
Sacramento, CA 95812-4015

2. Budget Contingency Clause

- A. It is mutually agreed that if the Budget Act of the current year and/or any subsequent years covered under this Agreement does not appropriate sufficient funds for the program, this Agreement shall be of no further force and effect. In this event, DPR shall have no liability to pay any funds whatsoever to Contractor or to furnish any other considerations under this Agreement and Contractor shall not be obligated to perform any provisions of this Agreement.
- B. If funding for any fiscal year is reduced or deleted by the Budget Act for purposes of this program, DPR shall have the option to either cancel this Agreement with no liability occurring to DPR, or offer an Agreement Amendment to Contractor to reflect the reduced amount.

3. Payment

- A. Costs for this Agreement shall be computed in accordance with State Administrative Manual (SAM) Sections 8752 and 8752.1.
- B. Nothing herein contained shall preclude advance payments pursuant to Article 1, Chapter 3, Part 1, Division 3, Title 2 of the California Government Code, Sections 11256 and 11257.
- C. Transportation and subsistence costs shall not exceed rates authorized to be paid UC system non-represented employees traveling within California.
- D. Contractor will be reimbursed for direct costs, other than salary costs, that are identified in Contractor's rates.

**EXHIBIT B
 Standard Agreement**

- E. Contractor will bill in arrears for costs incurred during the billing period. If applicable, salary costs will be itemized and billed by position. Documentation supporting specific salary costs will be presented if requested by DPR. Non-wage costs will be billed, in summary, according to general expense categories. A detailed report of transactions will support the billing. Individual expenditures exceeding \$500.00 will be supported by a photocopy of the original documentation. Documentation in support of expenditures less than \$500.00 will be presented if requested by DPR.
- F. Contractor shall not commence performance of work or services until this contract has been approved by the State. No payment will be made prior to approval nor for any work performed prior to approval of this Agreement.
- G. Ten percent (10%) of each invoice amount shall be withheld by DPR until completion of the services performed according to the scope of work and the terms of this agreement.

4. Rates

Estimated costs for these services are as follows:

Table I - Expenditures by Budget Line Item

| BUDGET ITEM | ITEM SUBTOTAL |
|-----------------------------------|------------------|
| Salaries & Wages | \$74,973 |
| Direct Benefits ^① | \$36,918 |
| Travel ^② | \$6,320 |
| Supplies & Materials ^③ | \$1,782 |
| Subtotal | \$119,993 |
| Indirect Costs, 25% ^④ | \$29,998 |
| Total Estimated Cost | \$149,991 |

- ① **Benefits include:** Worker's Compensation and other benefits appropriate for title. (NOTE: Student Interns are non-personnel employees with no benefits and shall be excluded from the percentage calculation of this line item.)
- ② **Travel:** Shall not exceed rates authorized to be paid UC system non-represented employees traveling within California.
- ③ **Supplies & Materials include:** Materials and supplies include cost for solvents, chemicals, pesticides, glassware, safety items (per pesticide label)
- ④ **Indirect Cost:** 25% of total direct costs rate includes: depreciation of buildings and equipment, utility consumption, operations and maintenance costs, and administrative services provided at the departmental and central level.

EXHIBIT B
Standard Agreement

TABLE II – SUMMARY OF PERSONNEL COSTS

| Researcher | Time | Cost |
|------------------------|-------------------|------------------|
| Les Greenberg, PI | Total: 8.4 months | \$63,619 |
| Fringe Benefits | | \$31,174 |
| Post-doctoral fellow | Total: 2 months | \$8,353 |
| Fringe benefits | | \$4,845 |
| Assistant/Technician | Total: various | \$3,000 |
| Fringe Benefits | | \$900 |
| Total Personnel | | \$111,891 |

Table III – Detail of Personnel Costs by Fiscal Year

| ITEM | 2014/15 FY | 2015/16 FY | | 2016/2017 FY | TOTAL |
|------------------------|----------------------------------|-------------------------------|----------|------------------------------------|-------------------|
| Personnel | 5/1/15- 6/30/15 (2 months) | 7/1/15-6/30/16 (12 months) | | 7/1/16- 4/15/17 (9.5 months) | |
| PI or co-PI | | | | | |
| Monthly salary | \$ 7,784 | \$ 7,940 | | \$ 8,098 | |
| Effort | 25% | 25% | 55% | 25% | |
| Months | 2 | 5 | 7 | 9.5 | |
| Total Effort (months) | 0.5 | 1.25 | 3.85 | 2.375 | 7.975 |
| Salary | \$ 3,892 | \$ 9,925 | \$30,569 | \$ 19,234 | \$ 63,619 |
| Benefits @ 49% | \$ 1,907 | \$ 4,863 | \$14,979 | \$ 9,425 | \$ 31,174 |
| Post-doctoral fellow | | | | | |
| Monthly salary | \$ 4,176 | \$ 4,176 | | \$ 4,176 | |
| Effort | 0% | 0% | | 100% | |
| Months/Total Effort | 0 | 0 | | 2 | 2 |
| Salary | \$ 0 | \$ 0 | | \$ 8,353 | \$ 8,353 |
| Benefits @ 58% | \$ 0 | \$ 0 | | \$ 4,845 | \$ 4,845 |
| Assistant/Technician | | | | | |
| Salary | \$ 0 | \$ 3,000 | | \$ 0 | \$ 3,000 |
| Benefits @ 30% | \$ 0 | \$ 900 | | \$ 0 | \$ 900 |
| TOTAL Personnel | \$ 5,799 | \$ 64,235 | | \$ 41,857 | \$ 111,891 |

EXHIBIT B
Standard Agreement

| | | | | |
|-------------------------------|----------|-----------|-----------|------------|
| Materials and Supplies | \$ 450 | \$ 890 | \$ 442 | \$ 1,782 |
| Travel | \$ 1,000 | \$ 4,800 | \$ 520 | \$ 6,320 |
| SUBTOTAL | \$ 7,249 | \$ 69,925 | \$ 42,819 | \$ 119,993 |
| Indirect Costs @ 25% | \$ 1,812 | \$ 17,481 | \$ 10,705 | \$ 29,998 |
| TOTALS | \$ 9,061 | \$ 87,407 | \$ 53,523 | \$ 149,991 |

5. Cost Limitation

- A. The total amount of this Agreement shall not exceed \$149,991.00.
- B. It is understood and agreed that this total is an estimate and that DPR will pay for only those services actually rendered as authorized by the DPR Contract Manager or his/her designee.

EXHIBIT C

(<http://www.dgs.ca.gov/ols/Resources/StandardContractLanguage.aspx>) (dated 6/9/10)

GIA-610

1. APPROVAL: This Agreement is not valid until signed by both parties and approved by the Department of General Services, if required.
2. AUDIT: The agency performing work under this Agreement agrees that the awarding department, the Department of General Services, the Bureau of State Audits, or their designated representative shall have the right to review and to copy any records and supporting documentation pertaining to the performance of this Agreement if it exceeds \$10,000. The agency performing work agrees to maintain such records for possible audit for a minimum of three (3) years after final payment, unless a longer period of record retention is stipulated.
3. PAYMENT: Costs for this Agreement shall be computed in accordance with State Administrative Manual Section 8752 and 8752.1.
4. AMENDMENT: No amendment or variation of the terms of this Agreement shall be valid unless made in writing, signed by the parties, and approved as required. No oral understanding or agreement not incorporated in the Agreement is binding on any of the parties.
5. SUBCONTRACTING: All subcontracting must comply with the requirements of the State Contracting Manual, Section 3.06.
6. ADVANCE PAYMENT: The parties to this interagency agreement may agree to the advancing of funds as provided in Government Code Sections 11257 through 11263.
7. DISPUTES: The agency performing work under this Agreement shall continue with the responsibilities under this Agreement during any dispute.
8. TIMELINESS: Time is of the essence in this Agreement.
9. NON-PAYMENT OF INVOICES – FUND TRANSACTION REQUEST: In accordance with Government Code Section 11255, the parties agree that when an invoice is not paid by the requested due date to the Contractor (agency providing the service) and the invoice is not disputed by the contracting Department (agency receiving the service), Contractor may send the contracting Department a 30-day notice that it intends to initiate a transfer of funds through a Transaction Request sent to the State Controller's Office. To facilitate a Transaction Request should one be needed, the contracting Department shall no later than 10 business days following execution of this agreement provide data to the Contractor for the appropriation to be charged including: fund number, organization code, fiscal year, reference, category or program, and, if applicable, element, component, and task.

EXHIBIT D
Standard Agreement

SPECIAL TERMS AND CONDITIONS

1. Termination

- A. Either Party reserves the right to terminate this agreement without cause upon thirty (30) days written notice to the other Party, or immediately in the event of a material breach. In the event of termination, Contractor shall be paid for all allowable costs incurred up to the date of termination, including any non-cancelable obligations.
- B. In the event that the total Agreement amount is expended prior to the expiration date, DPR may, at its sole discretion, terminate this Agreement with 30 days notice to contractor.

2. Subcontracting

Contractor shall perform the work contemplated with resources available within its own organization and no portion of the work shall be subcontracted.

3. Dispute Resolution

- A. DPR reserves the right to issue an order to stop work in the event that a dispute should arise, or in the event that DPR gives the performing agency a notice that this Agreement will be terminated. If DPR exercises this right, the stop-work order will be in effect until the dispute has been resolved or this Agreement has been terminated.
- B. Any dispute concerning a question of fact arising under the terms of this Agreement which is not disposed of within a reasonable period of time by agency employees normally responsible for the administration of this agreement, shall be brought to the attention of the Executive Officer or designated representative of each agency for joint resolution.
- C. Contractor shall continue to perform all its responsibilities under this agreement during any dispute until notified to stop work or expiration of this Agreement.

4. Harassment Free Workplace

The Department of Pesticide Regulation (DPR) is committed to providing a safe, secure environment, free from sexual misconduct. It is policy of the Department that employees have the right to work in an environment that is free from all forms of discrimination, including sexual harassment. This policy specifically speaks to freedom from a sexually harassing act that results in the creation of an intimidating, hostile or offensive work environment or that otherwise interferes with an individual's employment or work performance. As a Contractor with DPR, you and your staff are expected to

EXHIBIT D
Standard Agreement

comply with a standard of conduct that is respectful and courteous to DPR employees and all other persons contacted during the performance of this Agreement. Sexual harassment is unacceptable, will not be tolerated; and may be cause for prohibiting some or all of Contractor's staff from performing work under this Agreement.

EXHIBIT E
Standard Agreement

ADDITIONAL PROVISIONS

1. Disposition of Work Product

DPR retains use and non-commercial governmental distribution rights to all deliverables identified in Exhibit A of this Agreement.

2. Contractor Evaluation

Contractor is hereby notified that its performance under this Agreement will be evaluated within thirty (30) calendar days following the Expiration of this Agreement. The evaluation may include statements on the adequacy of the service or the product, whether the service was satisfactory, whether the service or the product was provided or completed within the time limitations, reasons for time or cost overruns, whether the product is operational or being utilized by the State, and/or the State plans for implementation, and the State's general impression as to the competency of Contractor and its staff. The evaluation shall be filed in the State's official Contractor Evaluation File.

3. Consulting Services

- A. Contractor is hereby advised of its duties, obligations and rights under Public Contract Code § 10335.5.
- B. Contractor's key personnel assigned to perform work under this Agreement and their level of responsibility shall be mutually acceptable to the State and Contractor.

EXHIBIT F
Standard Agreement

Les Greenberg
Specialist IV

Entomology

Department of Entomology
College of Natural and Agricultural
Sciences
University of California
Riverside, CA 92521
951.827.3217
les.greenberg@ucr.edu

Education

PhD Entomology 1981, University of Kansas
MA Biology 1975, City College, NY
BS Biology 1967, Brooklyn College

Research Area

Red imported fire ant research and extension program for UC Riverside since the arrival of the pest in California in 1988. Control of Argentine ants and red imported fire ants in urban and agricultural environments. Research in methods to improve monitoring for fire ants and to find replacements for organophosphates and other pesticides that are contaminating runoff water as well as the use of liquid sugar water baits in bait stations. Evaluation of newer pesticides and biocontrol agents that are not yet available in California. Other research involves studying flight behavior of the red imported fire ant in California, both in the laboratory and the field. Recent projects included studying the Sex pheromone of the slave making ant, *Polyergus breviceps*.

Selected Publications

Greenberg, L., Tollerup, K., and Rust, M. K. In press 2013. Control of Argentine ants (Hymenoptera: Formicidae) in citrus using methoprene and imidacloprid delivered in liquid bait stations. Florida Entomologist.

Greenberg, L., M. K. Rust, J. H. Klotz, D. Haver, J.N. Kabashima, S. Bondarenko, and J. Gan. Impact of ant control technologies on insecticide runoff and efficacy. 2010. Pesticide Science. DOI 10.1002/ps.1970.

Costa, H.S., L. Greenberg, J.H. Klotz, and M.K. Rust. 2005. Response of Argentine ants and red imported fire ants to permethrin-impregnated plastic strips: foraging rates, colonization of potted soil, and differential mortality. J. Econ. Entomol. 98(6): 2089-2094

Greenberg, L., A. Aliabadi, S. McElfresh, H. Topoff and J. Millar. 2004. Sex pheromone of the slave-making ant, *Polyergus breviceps*. J. Chem. Ecol. 30(6): 1297-1303.

Greenberg, L., D. Reiersen and M.K. Rust. 2003. Fipronil trials in California against the red imported fire ant, *Solenopsis invicta* Buren, using sugar water consumption and mound counts as measures of ant abundance. J. Urban and Agricultural Entomology. 20(4): 221-233.

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Peloquin, J.J. and L. Greenberg. 2003. Identification of midgut bacteria from fourth instar red imported fire ant larvae, *Solenopsis invicta* Buren (Hymenoptera: Formicidae). *J. Urban and Agricultural Entomology*. 20(3): 157-164.

Klotz, J.H., M.K. Rust, D. Gonzalez, L. Greenberg, H. Costa, P. Phillips, C. Gispert, D.A. Reiersen and K. Kido. 2003. Directed sprays and liquid baits to manage ants in vineyards and citrus groves. *J. Urban and Agricultural Entomology*. 20: 31-40.

Greenberg, L. 2003. Fire ants. *In: Encyclopedia of Insects*. V.H. Resh and R.T. Carde, eds., Academic Press, 414-416.

Klotz, J.H., K. Jetter, L. Greenberg, J. Hamilton, John Kabashima and D.F. Williams. 2003. An insect pest of agricultural, urban and wildlife areas: The red imported fire ant. *In: Exotic Pests and Diseases: Biology and Economics for Biosecurity*. Daniel A. Sumner, editor. Iowa State Press, pp. 151-166.

Costa, H., L. Greenberg, J. Klotz, and M.K. Rust. 2001. Monitoring the effects of granular insecticides for argentine ant control in nursery settings. *J. Urban and Agricultural Entomology*. 18: 13-22.

Klotz, J.H., L. Greenberg, C. Amrhein and M.K. Rust. 2000. Toxicity and repellency of borate-sucrose water baits to Argentine ants (Hymenoptera: Formicidae). *J. Economic Entomol.* 93: 1256-1258.

Klotz, J.H., L. Greenberg and G. Venn. 2000. Evaluation of two hydramethylnon granular baits for control of Argentine ants (Hymenoptera: Formicidae). *Sociobiology* 36: 201-107.

Greenberg, L. and J.H. Klotz. 2000. Argentine ant trail pheromone enhances consumption of liquid sucrose solution (Hymenoptera: Formicidae). *J. Economic Entomol.* 93: 119-122.

Greenberg, L., J. Kabashima, J.H. Klotz and C. Wilen. 1999. The red imported fire ant in California. *Pacific Coast Nurseryman*. 58: 69-73.

Klotz, J.H., L. Greenberg, B.L. Reid and L. Davis, Jr. 1998. Spatial distribution of colonies in three carpenter ants, *Camponotus pennsylvanicus*, *C. flordanus*, and *C. laevigatus* (Hymenoptera: Formicidae). *Sociobiology*. 32: 51-62.

Klotz, J.H., L. Greenberg and E.C. Venn. 1998. Liquid boric acid bait for control of argentine ants (Hymenoptera: Formicidae). *J. Economic Entomol.* 91: 910-914.

Klotz, J.H., L. Greenberg, H.H. Shorey and D.F. Williams. 1997. Alternative control strategies for ants around homes. *J. Agric. Entomol.* 14: 249-257.

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Professor of Entomology

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Education

PhD Entomology 1975 University of Kansas
M MA Entomology 1973 University of Kansas
BA Biology 1970 Hiram College, Ohio

Research Area

Urban entomology is the study of insects and arthropods associated with people in cities. At UC Riverside, the goals are to explore the basic biology of pests that attack stored foods, museum objects, fiber, structures, and pets and to develop integrated pest management strategies. Students conduct research on the biology and control of ants, cockroaches, fleas, yellowjackets, and termites, which represent the major economic pests in urban settings worldwide. In recent years, there has been an increasing awareness and interest in the use of alternative pest control technologies that reduce the amount of insecticide used. Ongoing projects include the use of baits to control ants in urban and agricultural areas, baiting and soil treatments to control subterranean termites, nutrient dynamics and food flow in subterranean termite and ant colonies, and the development of IPM programs to control yellowjackets. Recent studies conducted by our students include the response of ants to barrier treatments, nutrient and bait dynamics in ant and termite colonies, physiological ecology of drywood termites, insecticide resistance in cat flea populations, and interactions between ants and dead nestmates (necrophoresis). Our approach to urban pest management has always emphasized innovative and creative research. Student research topics balance both basic and applied aspects, ensuring maximum exposure and training to the field of urban entomology. We explore conventional as well as novel methods of pest management emphasizing the reduction in the use of pesticides. Little is known about the biology and ecology of most major urban insect pests. The urban pest management practices of the future have yet to be exploited.

Awards

2010 Entomological Society of America, Pacific Branch, Integrated Pest Management Team Award
2008 - Entomological Society of America Recognition Award in Entomology, Pacific Branch
2007 - Pest Control Hall of Fame
2002 - PCT/Zeneca Leadership Award
2002 - PCT/Syngenta Leadership Award

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2002 Fellow of the American Association for the Advancement of Science
2000 - Pest Control Technology's 25 Most Influential People in the Industry
2000 - Mallis Recognition Award, National Conference on Urban Entomology
1999-2000 - UC Presidential Scholar in Entomology
1999-2001 - Presidential Chair in Entomology
1995 - Book of Professional Services Award Pi Chi Omega
1995 - Excellence in Entomology Award -California Association, American Registry of Professional Entomologists
1994 W. W. Woodworth Award, Pacific Branch, Entomological Society of America
1993 Distinguished Achievement Award in Urban Entomology, Entomological Society of America
1990, 1995, 1997 - Orkin Research Award
1990, 1991, 1993 - Outstanding Urban Entomologist Award, Pacific Branch, Entomological Society of America

Publications

Greenberg, L., M. K. Rust, J. H. Klotz, D. Haver, J.N. Kabashima, S. Bondarenko, and J. Gan. Impact of ant control technologies on insecticide runoff and efficacy. 2010. Pesticide Science. DOI 10.1002/ps.1970.

Choe, D-H., Rust, M.K. 2008, Horizontal transfer of insecticides in the laboratory colonies of the Argentine ant (Hymenoptera). J. Econ. Entomol. 101: 1397-1405.

Rust, M.K., Saran, R.K. 2008. The toxicity, repellency, and effects of acetamiprid on the western subterranean termite (Isoptera: Rhinotermitidae). J. Econ. Entomol. 101: 1360-1366

Saran, R.K., Rust, M.K. 2008. Phagostimulatory sugars enhance uptake and horizontal transfer of hexaflumuron in the western subterranean termite (Isoptera: Rhinotermitidae). J. Econ. Entomol. Vol. 101: p.873-879.

Kabashima, J.N., Greenberg, L., Rust, M.K., Paine, T.D. 2007. Aggressive interactions between *Solenopsis invicta* and *Linepithema humile* (Hymenoptera: Formicidae) under laboratory conditions. J. Econ. Entomol. Vol. 100: p.148-154

Saran, R.J., J.G. Millar, and M K. Rust. 2007. Role of (3Z,6Z,8E) – Dodecatrien-1-ol in trail following, feeding, and mating behavior. J. Chem. Ecol. 33: 369-389.

Choe, D.-H. and M.K. Rust. 2007. Use of plant resin by a bee assassin bug *Apiomerus flaviventris* (Hemiptera:Reduviidae). Ann. Entomol. Soc. Am.100: 320-326.

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Choe, D.-H, and M. K. Rust. 2006. Agonistic behavior of Argentine ants to scales and scale parasitoids and their cuticular extracts. *Sociobiology* 48: 799-818.

Choe, D.-H. and M.K. Rust. 2006. Homopteran chemical signatures reduce aggression of tending ants. *Chemoecology* 16: 175-178.

Saran, R.J. and M.K. Rust. 2005. Feeding, uptake, and utilization of carbohydrates by the western subterranean termite (Isoptera: Rhinotermitidae). *J. Econ. Entomol.* 98: 1284-129

aagsma, K. and M. K. Rust. 2005. Effect of hexaflumerun on mortality of thewestern subterranean termite (Isoptera: Rhinotermitidae) during and following exposure and movement of hexaflumeron in termite colonies. *Pest Manage. Sci.* 61: 517-531.

Soeprono, A. M. and M. K. Rust. 2004. The effect of delayed toxicity of chemical barriers to control Argentine ants (Hymenoptera: Formicidae). *J. Econ. Entomol.* 97: 2021-2028.

Soeprono, A. M. and M. K. Rust. 2004. Effect of horizontal transfer of barrier insecticides to control Argentine ants (Hymenoptera: Formicidae). *J. Econ. Entomol.* 97: 1675-1681.

Hooper-Bui, L. M., M. K. Rust, and D. A. Reiersen. 2004. Predation of endangered California least tern, *Sterna antillarum browni* by southern fire ant, *Solenopsis xyloni* (Hymenoptera: Formicidae). *Sociobiology* 43: 1-18.

Vega, S. Y., and M. K. Rust. 2003. Determining the foraging range and origin of resurgence after treatment of Argentine ant (Hymenoptera: Formicidae). *J. Econ. Entomol.* 96: 844-849.

Fernandez, N. and M. K. Rust. 2003. Site fidelity in foraging Argentine ants. *Sociobiology* 41: 625-632.

Metzger, M.E. and M. K. Rust. 2001. Laboratory evaluation of fipronil and imidacloprid topical insecticides for control of plague vector *Oropsylla montanta* (Baker) (Siphonaptera: Ceratophyllidae and Pulicidae) of California ground squirrels (Rodentia: Sciuridae) using a novel nest box. *J. Med. Entomol.* 38: 465-470.

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Education:

Bachelor of Agriculture, Korea University, Seoul, Korea, 2002
Master of Science in Entomology, University of California, Riverside, USA, 2005
PhD in Entomology, University of California, Riverside, USA, 2009

Professional Experience

Assistant Cooperative Extension Specialist / Assistant Professor, 2011-current
Department of Entomology
University of California, Riverside

Post-doctoral Researcher, 2009-2011

Department of Environmental Sciences, Policy, and Management
University of California, Berkeley (Advisor – Dr. Neil Tsutsui)

Awards and Honors

1. Excellence prize in the student research (Metamorphosis of a Cicada, *Cryptotympana atrata* - Given Priority to the Emergence) (1986)
2. Departmental prize for high scholarship (Department of Agricultural Biology, University of Korea, Seoul, Korea) (2000)
3. Dean's Fellowship Award (University of California, 2003 - 2005)
4. Annual photography competition of National Wildlife Federation (2004)
5. Carl Strom / Western Exterminator Company Scholarship (2004 - 2009)
6. Anza-Borrego Institute Student Entomology Award (2006)
7. Temecula Valley Wine Society Scholarship (Nancy Johnston Memorial Scholarship) (2006)
8. Pi Chi Omega Scholarship (2007)
9. Best PhD Poster in annual entomology student seminar day (2007)
10. Selected as one of the "40 Under 40" future leaders of the pest management industry by Pest Management Professional Magazine (2008)
11. Bayer Young Scientist of the Year Competition (2nd place winner, sponsored by Bayer Environmental Science) (2008)
12. 1st place in Korean Young Entomologist (KYE) annual symposium student competition (as a part of ESA meeting in Reno, NV, November 2008)

Professional Organizations and Memberships:

Entomological Society of America (ESA)
Asia-Pacific Association of Chemical Ecologists (APACE)
Pi Chi Omega (The National Professional Pest Control Fraternity)

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Selected Recent Refereed Scientific Journal Articles

(10 most recent publications selected)

1. Choe, D.-H., S. R. Ramirez, N. D. Tsutsui. 2012. A silica gel based method for extracting insect surface hydrocarbons. *J. Chem. Ecol.* 38: 176-187.
 2. van Wilgenburg, E., A. Felden, D.-H. Choe, R. Sulc, J. Luo, K. J. Shea, M. A. Elgar, N. D. Tsutsui. 2012. Learning and discrimination of cuticular hydrocarbons in a social insect. *Biol. Lett.* 8: 17-20.
 3. Forero, D., D.-H. Choe, C. Weirauch. 2011. Resin gathering in Neotropical resin bugs (Insecta: Hemiptera: Reduviidae): functional and comparative morphology. *J. Morphol.* 272: 204-229.
 4. Choe, D.-H., R. S. Vetter, M. K. Rust. 2010. Development of virtual bait stations to control Argentine ants (Hymenoptera: Formicidae) in environmentally sensitive habitats. *J. Econ. Entomol.* 103: 1761-1769.
 5. Choe, D.-H., J. G. Millar, M. K. Rust. 2009. Chemical signals associated with life inhibit necrophoresis in Argentine ants. *Proceedings of the National Academy of Sciences USA.* 106: 8251-8255.
 6. Choe, D.-H., M. K. Rust. 2009. Dead ant walking. *Pest Control Technology.* 37: 48-55, 128.
 7. Choe, D.-H., M. K. Rust. 2008. Horizontal transfer of insecticides in laboratory colonies of the Argentine ant (Hymenoptera: Formicidae). *J. Econ. Entomol.* 101: 1397-1405.
 8. Choe, D.-H., M. K. Rust. 2007. Use of plant resin by a bee assassin bug, *Apiomerus flaviventris* (Hemiptera: Reduviidae). *Ann. Entomol. Soc. Am.* 100: 320-326.
 9. Choe, D.-H., M. K. Rust. 2006. Agonistic behavior of Argentine ants to scales and scale parasitoids and their cuticular extracts. *Sociobiology.* 48: 799-818.
 10. Choe, D.-H., M. K. Rust. 2006. Homopteran chemical signatures reduce aggression of tending ants. *Chemoecology.* 16: 175-178
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Water Quality Specialist**

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- jgan@ucr.edu

Academic Degrees:

- Ph.D., Zhejiang University, China, 1988

Specialization:

- Environmental fate, risk assessment and regulation of pesticides and emerging contaminants.
- Processes of organic contaminants in ecosystems, including biotic and abiotic degradation, adsorption, bioavailability, aquatic bioaccumulation, and ecotoxicity.
- Detoxification and remediation of organic contaminants.
- Evaluation and development of best management practices.
- Method development for trace contaminant analysis.

Representative Publications:

• Books

- Gan, J., P. Zhu, S.D. Aust, and A.T. Lemley. Pesticide Decontamination and Detoxification. American Chemical Society Symposium Series 863, American Chemical Society: Washington, DC, 2003.
- Gan, J., F. Spurlock, P. Hendley, and D. Weston. *Synthetic Pyrethroids: Occurrence and Effects in Aquatic Environments*. American Chemical Society Symposium Series 991, American Chemical Society: Washington, DC, 2003.
- **Journal Articles (selected from 150+)**
- Gan, J., Q. Wang, S.R. Yates, W.C. Koskinen and W.A. Jury. 2002. Dechlorination of chloroacetanilide herbicides by thiosulfate salts. *PNAS (USA)* 99: 5189-5194.
- Liu, W.P., J. Gan, D. Schlenk and W.A. Jury. 2005. Enantioselectivity in environmental safety of current chiral insecticides. *PNAS (USA)* 103: 701-706.
- Yang, W.C., F. Spurlock, W.P. Liu, and J. Gan. 2006. Inhibition of aquatic toxicity of synthetic pyrethroids by suspended sediment. *Environ. Toxicol. Chem.* 25: 1913-1919.
- Xu, Y.P., F. Spurlock, Z.J. Wang, and J. Gan. 2007. Comparison of five methods for measuring sediment toxicity of hydrophobic contaminants. *Environ. Sci. Technol.* 41: 8394-8399.
- Hunter, W., Y. Yang, F. Reichenberg, P. Mayer, and J. Gan. 2009. Measuring pyrethroids in sediment porewater using matrix-solid phase microextraction. *Environ. Toxicol. Chem.* 28: 36-43.

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- Budd, R., A. O'Geen, K. Goh, S. Bondarenko, and J. Gan. 2009. Efficacy of constructed wetlands in pesticide removal from tailwaters in the Central Valley, California. *Environ. Sci. Technol.* 43: 2925-2930.
- Bondarenko, S., and J. Gan. 2009. Simultaneous determination of free and total concentrations of hydrophobic compounds. *Environ. Sci. Technol.* 43: 3772-3777.
- Yang, Y., W. Hunter, S. Tao, and J. Gan. 2009. Microbial availability of different forms of phenanthrene in soils. *Environ. Sci. Technol.* 43: 1852-1857.
- Lin, K.D., W.P. Liu, and J. Gan. 2009. Oxidative removal of bisphenol-A with manganese dioxide: Kinetics, products, and pathways. *Environ. Sci. Technol.* 43: 3860-3864.
- Cui, X.Y., W. Hunter, Y. Yang, Y.X. Chen, and J. Gan. 2010. Bioavailability of sorbed phenanthrene and permethrin in sediments to *Chironomus tentans*. *Aquatic Toxicol.* 98: 83-90

Courses Taught:

- ENSC 127 - Fate and Transport of Contaminants in Soil (upper division)
- SWSC 204 - Environmental Organic Chemistry (graduate)

Graduate Program Affiliations and Research Focus Areas:

- **Research Focus Areas**
- Environmental Chemistry and Ecotoxicology
- Soil and Water Sciences