

STATE OF CALIFORNIA  
**STANDARD AGREEMENT**  
 STD 213 (Rev 05/18)

AGREEMENT NUMBER <b>18-C0023</b>
REGISTRATION NUMBER



1. This Agreement is entered into between the State Agency and the Contractor named below:
- STATE AGENCY'S NAME  
 Department of Pesticide Regulation, hereinafter referred to as "State"
- CONTRACTOR'S NAME  
 The Regents of the University of California, Riverside, hereinafter referred to as "University"
2. The term of this Agreement is: July 1, 2018 through June 30, 2020
3. The maximum amount of this Agreement is: \$ 149,998.00
4. The Parties agree to comply with the terms and conditions of the following Exhibits, which by this reference are made a part of the Agreement.

<b>Exhibit A – A7:</b> A–Scope of Work; A1–Deliverables; A2–Key Personnel; A3–Authorized Representatives; A4–Use of Intellectual Property; A5–Resumes/Biosketch; A6–Current & Pending Support; A7-Third Party Confidential Information (if applicable)	12 page(s)
<b>Exhibit B – B–Budget;</b> B1–Budget Justification; B2– Subawardee Budgets (if applicable); B3– Invoice Elements	4 page(s)
<b>Exhibit C* – University Terms and Conditions</b>	UTC-518

- Check mark additional Exhibits below, and attach applicable Exhibits or provide internet link:
- Exhibit D** – Additional Requirements Associated with Funding Sources page(s)
- Exhibit E** – Special Conditions for Security of Confidential Information page(s)
- Exhibit F** – Access to State Facilities or Computing Resources page(s)
- Exhibit G** – Negotiated Alternate UTC Terms 1 page(s)

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.dgs.ca.gov/ols/Resources/ModelContractLanguageUniversities.aspx>.

**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, Riverside		
BY (Authorized Signature) 	DATE SIGNED (Do not type) 7/12/2018	
PRINTED NAME AND TITLE OF PERSON SIGNING Robert Chan, Principal Contract & Grant Officer		
ADDRESS 245 University Office Building, University of California, Riverside, CA 92521-0217		
STATE OF CALIFORNIA		
AGENCY NAME Department of Pesticide Regulation		
BY (Authorized Signature) 	DATE SIGNED (Do not type) 7.23.18	
PRINTED NAME AND TITLE OF PERSON SIGNING Anise Severns, Assistant Director		
ADDRESS 1001 I Street, Sacramento, CA 95814		
		<input checked="" type="checkbox"/> Exempt per: Delegation Letter 74.6

## Exhibit A – Scope of Work

### Project Summary & Scope of Work

Contract       Grant

PI Name: Jay Gan

Project Title: Pavement Dust as a Source for Pesticide Runoff Contamination in Urban Environments

#### Project Summary/Abstract

*Briefly describe the long-term objectives for achieving the stated goals of the project.*

1. The objectives of this project are to provide new and critical knowledge that will improve our understanding of the root cause for the contamination of pavement dust by pesticides, interactions of micro-compartments in dust movement, deposition, resuspension and clearance. This knowledge may be used for developing and refining source-oriented mitigation options.

#### If Third-Party Confidential Information is to be provided by the State:

- Performance of the Scope of Work is anticipated to involve use of third-party Confidential Information and is subject to the terms of this Agreement; **OR**
- A separate CNDA between the University and third-party is required by the third-party and is incorporated in this Agreement as Exhibit A7, Third Party Confidential Information.

#### Scope of Work

*Describe the goals and specific objectives of the proposed project and summarize the expected outcomes. If applicable, describe the overall strategy, methodology, and analyses to be used. Include how the data will be collected, analyzed, and interpreted as well as any resource sharing plans as appropriate. Discuss potential problems, alternative strategies, and benchmarks for success anticipated to achieve the goals and objectives.*

#### 2. Problem Statement

Pesticides used around homes may transport as attachment to loose soil and dust particles to urban streams. Understanding the pathways through which soil/dust particles are contaminated by pesticides will provide information useful for developing effective mitigation strategies for protecting urban surface water from pesticide contamination.

#### 3. Background and Goals

Pesticides such as pyrethroids and fipronil are frequently found in residential runoff as a result of insecticide use for preventive and eradicated structural pest control. Recent studies have linked pavement surfaces such as driveway, sidewalks and street pavement to the sustained occurrence of

pyrethroids and fipronil in residential runoff. Loose particles on the impervious surfaces have been found to contain significant levels of pyrethroids and fipronil (and metabolites). Given that these particles are easily dislodged and moved in a surface runoff event, the loose solids on pavement are considered a primary source for pesticides contaminating surface runoff and urban streams draining residential areas. While these studies have established the linkage between impervious surfaces and runoff contamination, it is yet unknown where the pesticide-laden dust particles come from, or how they are moved between the various compartments in a residential environment at the lot or neighborhood scale. These knowledge gaps call into question the effectiveness of proposed mitigation practices (e.g., no treatment on the driveway under the garage door), and hinder the development of more holistic management strategies.

In outdoor environments, pavement surfaces are always covered with loose soil or dust particles. These particles may be present at the time of pesticide spray and become dosed from the application. They may also be deposited by wind, water or traffic disturbance from adjacent areas treated with pesticides, e.g., perimeter around a house, and landscaped front or backyard. If the latter is a significant mechanism for the occurrence of pesticide-laden pavement dust, avoiding treatment of certain pavement areas would be ineffective. At present the source of pesticide residues in the pavement dust is not well known, and movement of pesticide residues with pavement dust among the various micro-compartments has yet to be characterized.

#### **4. Work to be Performed**

Task 1: Using homes in Riverside and Orange County, University will sample pavement dust and adjacent surface soil for analysis of elemental composition to fingerprint and test if pavement dust particles are originated from areas away from the pavement.

Task 2: University will study contributions of adjacent compartments to accumulation of pesticide-laden dust on untreated pavement surfaces, including areas conducive to runoff.

Task 3: University will study the temporal trends and connection to pest management practices of the accumulation of pesticide-laden dust on pavement surfaces conducive to runoff.

Task 4: University will evaluate effectiveness of mitigation practices and integrate new knowledge to refine mitigation strategies.

#### **5. State Responsibilities**

- 1) State will review the draft final report and provide feedback to the author prior to submission of the final report.
- 2) State will host annual Surface Water Protection Program Contractor workshops to receive updates and final results.

**Exhibit A1 - Deliverables**

**SCHEDULE OF DELIVERABLES**

List all items that will be delivered to the State under the proposed Scope of Work. Include all reports, including draft reports for State review, and any other Deliverables, if requested by the State and agreed to by the Parties.

If use of any Deliverable is restricted or is anticipated to contain preexisting Intellectual Property with any restricted use, it will be clearly identified in Exhibit A4, Use of Preexisting Intellectual Property.

Unless otherwise directed by the State, the University Principal Investigator shall submit all Deliverables to the State Contract Project Manager, identified in Exhibit A3, Authorized Representatives.

<b>Deliverable</b>	<b>Description</b>	<b>Due Date</b>
Progress Reports	Annual progress reports to be presented at the annual CDPR meeting	As scheduled
Draft Report	Draft report summarizing findings and recommendations	May 30, 2020
Final Report	Final report summarizing findings and recommendations	June 30, 2020
<b>The following Deliverables are subject to Section 19. Copyrights, paragraph B of Exhibit C</b>		

## Exhibit A2 – Key Personnel

### KEY PERSONNEL

List Key Personnel as defined in the Agreement starting with the PI, by last name, first name followed by Co-PIs. Then list all other Key Personnel in alphabetical order by last name. For each individual listed include his/her name, institutional affiliation, and role on the proposed project. Use additional consecutively numbered pages as necessary.

Last Name, First Name	Institutional Affiliation	Role on Project
<b>PI:</b>		
Gan, Jay	University of California, Riverside	<i>Principal Investigator</i>
<b>Co-PI(s) – if applicable:</b>		
<i>Last name, First name</i>	<i>Institutional affiliation</i>	<i>Role on the project</i>
<i>Last name, First name</i>	<i>Institutional affiliation</i>	<i>Role on the project</i>
<b>Other Key Personnel (if applicable):</b>		
<i>Last name, First name</i>	<i>Institutional affiliation</i>	<i>Role on the project</i>
<i>Last name, First name</i>	<i>Institutional affiliation</i>	<i>Role on the project</i>

## Exhibit A3 – Authorized Representatives

### AUTHORIZED REPRESENTATIVES AND NOTICES

The following individuals are the authorized representatives for the State and the University under this Agreement. Any official Notices issued under the terms of this Agreement shall be addressed to the Authorized Official identified below, unless otherwise identified in the Agreement.

<b>State Agency Contacts</b>	<b>University Contacts</b>
<p>Agency Name: Department of Pesticide Regulation  <b>Contract Project Manager (Technical)</b></p> <p>Name: Robert Budd            Senior Environmental Scientist            Address: Department of Pesticide Regulation            1001 I St.            Sacramento, CA 95814            Telephone: 916-445-2505            Fax: 916-324-4088            Email: robert.budd@cdpr.ca.gov</p>	<p>University Name: University of California at Riverside  <b>Principal Investigator</b></p> <p>Name: Jay Gan, Professor            Address: Department of Environmental Science            University of California, Riverside,            Riverside, CA 92521            Telephone: 951-827-2712            Fax: 951-827-3993            Email: <a href="mailto:jgan@ucr.edu">jgan@ucr.edu</a></p> <p>Designees to certify invoices under Section 14 of Exhibit C on behalf of PI:</p> <ol style="list-style-type: none"> <li>1. &lt;Name&gt;, &lt;Title&gt;, &lt;EmailAddress&gt;</li> <li>2. &lt;Name&gt;, &lt;Title&gt;, &lt;EmailAddress&gt;</li> <li>3. &lt;Name&gt;, &lt;Title&gt;, &lt;EmailAddress&gt;</li> </ol>
<p><b>Authorized Official (contract officer)</b></p> <p>Name: Anise Severns            Assistant Director            Address: Department of Pesticide Regulation            1001 I St, 4<sup>th</sup> Floor            Sacramento, CA 95814</p> <p><b>Send notices to (if different):</b></p> <p>Name: Kim Bateman            Contract Analyst            Address: Department of Pesticide Regulation            1001 I St.            Sacramento, CA 95814            Telephone: 916-445-2512            Fax: 916-445-6845</p>	<p><b>Authorized Official</b></p> <p>Name: Robert Chan, Principal Contract and Grant Officer            Address: 245 University Office Building, University of California, Riverside, CA 92521-0217            Telephone: 951-827-6194            Fax: 951-827-4483            Email: robert.chan@ucr.edu</p> <p><b>Send notices to (if different):</b></p> <p>Name: &lt;Name&gt;            &lt;Title&gt;            Address: &lt;Department&gt;            &lt;Address&gt;            &lt;City,State,Zip&gt;</p>

<p>Email: Robert.Budd@cdpr.ca.gov</p>	<p>Telephone: &lt;Telephone#&gt;          Email: &lt;EmailAddress&gt;</p>
<p><b>Administrative Contact</b></p> <p>Name: Kim Bateman          Contract Analyst          Address: Department of Pesticide Regulation          1001 I Street          Sacramento, CA          Telephone: 916-445-2512          Fax: 916-445-6845          Email: kim.bateman@cdpr.ca.gov</p>	<p><b>Administrative Contact</b></p> <p>Name: Robert Chan, Principal Contract and Grant Officer          Address: 245 University Office Building, University of California, Riverside, CA 92521-0217          Telephone: 951-827-6194          Fax: 951-827-4483          Email: robert.chan@ucr.edu</p>
<p><b>Financial Contact/Accounting</b></p> <p>Name: Department of Pesticide Regulation          Accounts Payable          Address: Department of Pesticide Regulation          Accounts Payable          P.O. Box 4015          Sacramento, CA 95812-4015          Telephone: (916) 445-4149          Email: Accounts_Payable@cdpr.ca.gov</p>	<p><b>Authorized Financial Contact/Invoicing</b></p> <p>Name: Fred Devera          Fund Manager          Address: Business &amp; Finance Div., Accounting Office-002, Riverside, CA 92521-0217          Telephone: 951-827-1948          Fax: 951-827-3314          Email: <a href="mailto:fred.devera@ucr.edu">fred.devera@ucr.edu</a></p> <p>Payment Address: UCR Cashier's Office          University of California, Riverside          900 University Avenue          Riverside, CA 92507</p> <p>Designees for invoice certification in accordance with Section 14 of Exhibit C on behalf of the Financial Contact:</p> <ol style="list-style-type: none"> <li>1. Kimberly Gala, EMF Accountant 2,  <a href="mailto:kimberly.gala@ucr.edu">kimberly.gala@ucr.edu</a></li> <li>2. &lt;Name&gt;, &lt;Title&gt;, &lt;EmailAddress&gt;</li> <li>3. &lt;Name&gt;, &lt;Title&gt;, &lt;EmailAddress&gt;</li> </ol>

**Exhibit A4 – Use of Intellectual Property**

**USE OF INTELLECTUAL PROPERTY**

*If either Party will be using any third-party or pre-existing intellectual property (including, but not limited to data, copyrighted works, known patents, trademarks, service marks and trade secrets) "IP" with restrictions on use, then list all such IP and the nature of the restriction below. If no third-party or pre-existing IP will be used, check "none" in this section.*

A. State: Preexisting IP to be provided to the University from the State or a third party for use in the performance in the Scope of Work.

None or  List:

Owner (Name of State Agency or 3 <sup>rd</sup> Party)	Description	Nature of restriction:

B. University: Restrictions in Preexisting IP included in Deliverables identified in Exhibit A1, Deliverables.

None or  List:

Owner (Name of University or 3 <sup>rd</sup> Party)	Description	Nature of restriction:

C. Anticipated restrictions on use of Project Data.

*If the University PI anticipates that any of the Project Data generated during the performance of the Scope of Work will have a restriction on use (such as subject identifying information in a data set) then list all such anticipated restrictions below. If there are no restrictions anticipated in the Project Data, then check "None" in this section.*

None or  List:

Owner (University or 3 <sup>rd</sup> Party)	Description	Nature of Restriction:



## Exhibit A5 - RÉSUMÉ/BIOSKETCH

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### RÉSUMÉ/BIOSKETCH

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#### Jay J. Gan

##### *Professor of Environmental Chemistry*

Department of Environmental Sciences, UC Riverside, CA 92521

Phone: (951) 827-2712; Fax: (951) 827-3993; email: jgan@ucr.edu

#### I. Professional and Education Background

7.2004 - now	Professor of Environmental Chemistry, Dept. Environmental Sciences, Univ. California, Riverside, CA
10.2007-7.2010	Department Chair, Dept. Environmental Sciences, Univ. California, Riverside, CA
7.2001-6.2003	Assistant Professor, Dept. Environmental Sciences, Univ. California, Riverside, CA
7.2003-6.2004	Associate Professor, Dept. Environmental Sciences, Univ. California, Riverside, CA
5.1995-7.2001	Assistant and Associate Researcher, The U.S. Salinity Laboratory, Riverside, CA
3.1993-5.1995	Postdoctoral Scientist, the U.S. Salinity Laboratory, Riverside, CA
8.1991-3.1993	Postdoctoral Scientist, Univ. Minnesota, St. Paul, MN
2.1990-8.1991	Visiting Fellow, Agrochemicals Unit, International Atomic Energy Agency (IAEA) Laboratories, Seibersdorf, Austria
9.1982-7.1988	Ph.D., Environmental Chemistry, Zhejiang University, Hangzhou, China

#### II. Expertise and Interest

- Environmental fate, transport and risk assessment of organic contaminants
- Biotic and abiotic transformations, phase partition, leaching, runoff, aquatic bioaccumulation, and plant uptake of organic contaminants
- Contaminant bioavailability in sediments and soils, biomimetic analysis, and ecotoxicology
- Analysis of trace organic residues in environmental matrices
- Wastewater reuse and fate/risks of wastewater-borne contaminants
- Mitigation strategies and risk-reduction practices

#### III. Professional Honors and Service

- Fellow, ACS (American Chemical Society)-AGRO Division, 2017
- Fellow, SSSA (Soil Science Society of America), 2010
- **Fellow, AAAS (American Association for Advancement of Science), 2008**
- Fellow, ASA (American Society of Agronomy), 2005
- Co-Editor-in-Chief, *Science of the Total Environment*, 01/2016 – now.
- Associate Editor, *Environmental Pollution*, 01/2013 – 12/2015.
- Chair, Division S-11 “Soil and Environmental Quality”, SSSA, 2011
- Vice Chair Programming, IUPAC International Congress of Pesticide Chemistry, San Francisco, 2014
- Program Chair, Agrochemicals Division, American Chemical Society, 2015-2016
- Chair, Agrochemicals Division, American Chemical Society, 2016-2017

#### IV. Teaching

- Introduction to Environmental Science (Lower Division, Undergraduate Level, 240-320 students)
  - Chemical Fate and Transport in Environment (Upper Division, Undergraduate)
  - Environmental Organic Chemistry (Graduate Level)
  - Fate and Transport of Chemicals in Environment (Graduate Level)
- V. Selected Journal Publications: (total >270)

PNAS:

1. Pennington, M.J., J.A. Rothman, S. L. Dudley, M. B. Jones, Q. S. McFrederick, J. Gan, and J. T. Trumble. 2017. Contaminants of emerging concern affect *Trichoplusia ni* growth and development on artificial diets and a key host plant. *Proceedings of National Academy of Science (USA)*. 9923–9931 ([www.pnas.org/cgi/doi/10.1073/pnas.1713385114](http://www.pnas.org/cgi/doi/10.1073/pnas.1713385114))
2. Liu, W.P., J. Gan,\* D. Schlenk and W.A. Jury. 2005. Enantioselectivity in environmental safety of current chiral insecticides. *Proceedings of National Academy of Sciences (USA)* 103: 701-706.
3. Gan, J.,\* Q. Wang, S.R. Yates, W.C. Koskinen and W.A. Jury. 2002. Dechlorination of chloroacetanilide herbicides by thiosulfate salts. *Proceedings of National Academy of Sciences (USA)* 99: 5189-5194.

Environmental Science & Technology:

4. Gan, J., S.R. Yates, D. Wang and W.F. Spencer. 1996. Effect of soil factors on methyl bromide volatilization after soil application. *Environmental Science & Technology* 30: 1629-1636.
5. Yates, S.R., D. Wang, F.F. Ernst and J. Gan. 1997. Methyl bromide emissions from agricultural fields: Bare-soil, deep injection. *Environmental Science & Technology* 31: 1136-1143.
6. Wang, D., S.R. Yates, F.F. Ernst, J. Gan, F. Gao and J.O. Becker. 1997. Methyl bromide emission reduction with field management practices. *Environmental Science & Technology* 31: 3017-3022.
7. Gao, F., S.R. Yates, M.V. Yates, J. Gan and F.F. Ernst. 1997. Design, fabrication, and application of a dynamic chamber for measuring gas emissions from soil. *Environmental Science & Technology* 31: 148-153.
8. Wang, D., S.R. Yates, F.F. Ernst, J. Gan and W.A. Jury. 1997. Reducing methyl bromide emission with a high barrier plastic film and reduced dosage. *Environmental Science & Technology* 31: 3686-3691.
9. Gan, J., S.R. Yates, J.O. Becker, and D. Wang. 1998. Surface amendment of fertilizer ammonium thiosulfate to reduce methyl bromide emission from soil. *Environmental Science & Technology* 32: 2438-2441.
10. Gan, J., S.R. Yates, S. Papiernik and D. Crowley. 1998. Application of organic amendments to reduce volatile pesticide emissions from soil. *Environmental Science & Technology* 32: 3094-4098.
11. Gan, J., S.K. Papiernik, W.C. Koskinen, and S.R. Yates. 1999. Evaluation of accelerated solvent extraction (ASE) for analysis of pesticide residues in soil. *Environmental Science & Technology* 33: 3249-3253.
12. Papiernik, S.K., J. Gan, J.A. Knuteson and S.R. Yates. 1999. Sorption of fumigants to agricultural films. *Environmental Science & Technology* 33: 1213-1217.
13. Wang, Q., J. Gan, S.K. Papiernik and S.R. Yates. 2000. Transformation and detoxification of halogenated fumigants by ammonium thiosulfate. *Environmental Science & Technology* 34:3717-3721.
14. Papiernik, S.K., S.R. Yates and J. Gan. 2001. An approach for estimating the permeability of agricultural films. *Environmental Science & Technology*. 35:1240-1246.
15. Xu, J.M., J. Gan, S.K. Papiernik, J.O. Becker and S.R. Yates. 2003. Incorporation of fumigants into soil organic matter. *Environmental Science & Technology* 37: 1288-1291.
16. Gan, J., Y. Zhu, C. Wilen, D. Crowley and D. Pittenger. 2003. Effects of planting covers on herbicide persistence in landscape soils. *Environmental Science & Technology* 37: 2775-2779.
17. Lee, S.J., J. Gan, W.P. Liu and M.A. Anderson. 2003. Evaluation of  $K_d$  underestimation using solid phase microextraction. *Environmental Science & Technology* 37: 5597-5602.
18. Wang, L.M., W.P. Liu, C.X. Yang, Z.Y. Pan, J. Gan, C. Xu, M.R. Zhao, and D. Schlenk. 2007. Enantioselectivity in endocrine disruption potential and uptake of bifenthrin. *Environmental Science & Technology* 41: 6124-6128.
19. Zheng, W., J. Gan, S.K. Papiernik, and S.R. Yates. 2007. Identification of volatile/semi-volatile products derived from *cis*-1,3-dichloropropene chemical remediation by thiosulfate. *Environmental Science & Technology* 41: 6454-6459.
20. Xu, Y.P., F. Spurlock, Z.J. Wang, and J. Gan. 2007. Comparison of five methods for measuring sediment toxicity of

- hydrophobic contaminants. *Environmental Science & Technology* 41: 8394-8399.
21. Yang, Y., W. Hunter, S. Tao, and J. Gan. 2008. Relationships between desorption intervals and availability of sediment-borne hydrophobic contaminants. *Environmental Science & Technology* 42: 8446-8451.
  22. Yang, Y., W. Hunter, S. Tao, and J. Gan. 2009. Microbial availability of different forms of phenanthrene in soils. *Environmental Science & Technology* 43: 1852-1857.
  23. 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. *Environmental Science & Technology* 43: 2925-2930.
  24. Bondarenko, S., and J. Gan. 2009. Simultaneous determination of free and total concentrations of hydrophobic compounds. *Environmental Science & Technology* 43: 3772-3777.
  25. Lin, K.D., W.P. Liu, and J. Gan. 2009. Oxidative removal of bisphenol-A with manganese dioxide: Kinetics, products, and pathways. *Environmental Science & Technology* 43: 3860-3864.
  26. Lin, K.D., W.P. Liu, and J. Gan. 2009. Reaction of tetrabromobisphenol A (TBBPA) with manganese dioxide: Kinetics, products, and pathways. *Environmental Science & Technology* 43: 4480-4486.
  27. Delgado-Moreno, L., L. Wu, and J. Gan. 2010. Effect of dissolved organic carbon on sorption of pyrethroids to sediments. *Environmental Science & Technology* 44: 8473-8478.
  28. Jiang, W., J. Gan, and D. Haver. 2011. Sorption and desorption of pyrethroid insecticide permethrin on concrete. *Environmental Science & Technology* 45: 602-607.
  29. Wang, W., L. Moreno, Q.F. Ye, and J. Gan. 2011. Improved measurements of partition coefficients for polybrominated diphenyl ethers (PBDEs). *Environmental Science & Technology* 45: 1521-1527.
  30. Gan, J., S. Bondarenko, L. Oki, D. Haver, and J.X. Li. 2012. Occurrence of fipronil and its biologically active derivatives in urban residential runoff. *Environmental Science & Technology* 46: 1489-1495.
  31. Jiang, W.Y., and J. Gan. 2012. Importance of fine particles in pesticide runoff from concrete surfaces and its prediction. *Environmental Science & Technology* 46: 6028-6034.
  32. Li, J.Y., L. Dodgen, Q.F. Ye, and J. Gan. 2013. Degradation kinetics and metabolites of carbamazepine in soil. *Environmental Science & Technology* 47: 3678-3684.
  33. Cui, X.Y., and J. Gan. 2013. Solid-phase microextraction (SPME) with stable isotope calibration for measuring bioavailability of hydrophobic organic contaminants. *Environmental Science & Technology* 47: 9833-9840.
  34. Li, J.Y., J.B. Zhang, C. Li, W. Wang, H.Y. Wang, J. Gan, Q.F. Ye, X.Y. Xu, and Z. Li. 2013. Stereoisomeric isolation and stereoselective fate of insecticide Paichongding in flooded paddy soils. *Environmental Science & Technology* 47: 12768-12774.
  35. Lin, K.D., C. Yan, and J. Gan. 2014. Production of hydroxylated polybrominated diphenyl ethers (OH-PBDEs) from bromophenols by manganese dioxide. *Environmental Science & Technology* 48: 263-271.
  36. Lu, Z.J., and J. Gan. 2014. Isomer-specific biodegradation of nonylphenol in river sediments. *Environmental Science & Technology* 48: 1008-1014.
  37. Jia, F., L.J. Bao, J. Crago, D. Schlenk, and J. Gan. 2014. Use of isotope dilution method (IDM) to predict bioavailability of organic pollutants in historically contaminated sediments. *Environmental Science & Technology* 48: 7966-7973.
  38. Wu, X.Q., J. Conkle, F. Ernst, and J. Gan. 2014. Treated wastewater irrigation: Uptake of pharmaceutical and personal care products by common vegetables under field conditions. *Environmental Science & Technology* 48: 11286-11293.
  39. Lin, K.D., J. Gan, and W.P. Liu. 2014. Production of hydroxylated polybrominated diphenyl ethers (HO-PBDEs) from bromophenols by bromoperoxidase-catalyzed dimerization. *Environmental Science & Technology* 48: 11977-11983.
  40. Sun, J.Q., X.Q. Wu, and J. Gan. 2015. Uptake and metabolism of phthalate esters by edible plants. *Environmental Science & Technology* 49: 8471-8478.
  41. Oskui, S.M., G. Diamante, C.Y. Liao, W. Shi, J. Gan, D. Schlenk, and W.H. Grover. 2016. Assessing and reducing the toxicity of 3D-printed parts. *Environmental Science & Technology Letters* 3: 1-6.
  42. Zhang, J.Y., J. Zhang, J. Gan, J. Liu, and W.P. Liu. 2016. Endocrine disrupting effects of pesticides through interference with human glucocorticoid receptor. *Environmental Science & Technology* 50: 435-443.
  43. Shen, G.Q., D.J. Ashworth, J. Gan, and S.R. Yates. 2016. Biochar amendment to the soil surface reduces fumigant emissions and enhances soil microorganism recovery. *Environmental Science & Technology* 50: 1182-1189.
  44. Jiang, W.Y., J. Conkle, Y.Z. Luo, J.Y. Li, K. Xu, and J. Gan. 2016. Occurrence, distribution and accumulation of pesticides in exterior residential areas. *Environmental Science & Technology* 50: 12592-12601.
  45. Lao, W.J., Y.W. Hong, D. Tsukada, K. Maruya, and J. Gan. 2016. A new film-based passive sampler for moderately hydrophobic organic compounds. *Environmental Science & Technology* 50: 13470-13476.
  46. Fu, Q.G., J.B. Zhang, D. Schlenk, D. Borchardt, and J. Gan. 2017. Direct conjugation of emerging contaminants in higher

plants: An overlooked risk? *Environmental Science & Technology* 51: 6071-6081.

47. Richards, J., Z.J. Lu, Q.G. Fu, D. Schlenk, and J. Gan. 2017. Conversion of pyrethroid insecticides to 3-phenoxybenzoic acid on urban hard surfaces. *Environmental Science & Technology Letters* 4: 546-550.

Water Research:

48. Liu, W.P., H.H. Zhang, B.P. Cao, K.D. Lin, and J. Gan. 2011. Oxidative removal of bisphenol A using zero valent aluminum-acid system. *Water Research* 45: 1872-1878.
49. Jiang, W.Y., D. Haver, M. Rust, and J. Gan. 2012. Runoff of pyrethroid insecticides from concrete surfaces following simulated and natural rainfalls. *Water Research* 46: 645-652.
50. Luo, Y.Z., F. Spurlock, W.Y. Jiang, B.C. Jorgenson, T. Young, J. Gan, S. Gill, and K.S. Goh. 2013. Pesticide washoff from concrete surfaces: literature review and a new modeling approach. *Water Research* 47: 3163-3172.
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52. Lu, Z.J., R. Reif-Lopez, and J. Gan. 2015. Isomeric-specific biodegradation of nonylphenol in the activated sludge bioreactor. *Water Research* 282-290.
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## Exhibit A6 – Current & Pending Support

### CURRENT & PENDING SUPPORT

University will provide current & pending support information for Key Personnel identified in Exhibit A2 at time of proposal and upon request from State agency. The "Proposed Project" is this application that is submitted to the State. Add pages as needed.

PI: Jay Gan					
Status (currently active or pending approval)	Award # (if available)	Source (name of the sponsor)	Project Title	Start Date	End Date
Proposed Project	18-C0023	DPR	Pavement Dust as a Source for Pesticide Runoff Contamination in Urban Environments	7/1/2018	06/30/2020
CURRENT		CDC	Sustainable Use of Chemicals in Complex Urban and Suburban Environments	7/2017	6/2021
CURRENT		USDA-NIFA	A Tiered Framework for Evaluating Contaminants of Emerging Concerns (CECs) to Protect Food Safety	3/2018	3/2022
CURRENT		CDPR	Mitigation of Urban Pesticide Runoff by Storm Retention Basins	01/01/2017	6/30/2019
CURRENT		USDA-NIFA	Contaminants of Emerging Concern (CECs) in Reclaimed Water and Biosolids: Safe for Vegetable and Fruit Crops?	01/2016	12/2018
PENDING		EPA-STAR	Reclaimed Water Irrigation: Plant Accumulation and Risks of Contaminants of Emerging Concern (CECs)	8/2014	8/2018

NAME OF INDIVIDUAL					
Status	Award #	Source	Project Title	Start Date	End Date
Proposed Project					
CURRENT					
CURRENT					
PENDING					

NAME OF INDIVIDUAL					
Status	Award #	Source	Project Title	Start Date	End Date
Proposed Project					
CURRENT					
CURRENT					
PENDING					

**Exhibit B - Budget**  
**Budget for Project Period**

Principal Investigator (Last, First):

Gan, Jay

Exhibit B

COMPOSITE BUDGET FOR ENTIRE PROPOSED PROJECT PERIOD					
		07/01/2018	to	06/30/2020	
BUDGET CATEGORY	From: To:	7/1/2018 6/30/2019 Year 1	7/1/2019 06/30/2020 Year 2		TOTAL
PERSONNEL: <i>Salary and fringe benefits.</i>		\$36,048	\$37,162		\$73,210
TRAVEL		\$2,500	\$2,500		\$5,000
MATERIALS & SUPPLIES		\$6,832	\$6,830		\$13,662
EQUIPMENT		\$0	\$0	\$0	\$0
CONSULTANT		\$0	\$0	\$0	\$0
SUBRECIPIENT		\$0	\$0	\$0	\$0
OTHER DIRECT COSTS (ODC)	<i>Subject to IDC Calc</i>				
Tuition & Fees, GSHIP	<i>N</i>	\$17,226	\$17,932	\$0	\$35,158
ODC #2	<i>Y</i>	\$0	\$0	\$0	\$0
ODC #3	<i>Y</i>	\$0	\$0	\$0	\$0
ODC #4	<i>Y</i>	\$0	\$0	\$0	\$0
ODC #5	<i>Y</i>	\$0	\$0	\$0	\$0
ODC #6	<i>Y</i>	\$0	\$0	\$0	\$0
<b>TOTAL DIRECT COSTS</b>		\$62,606	\$64,424		\$127,031
Indirect (F&A) Costs	<b>F&amp;A Base</b>				
<i>Rate</i>	<i>MTDC *</i>	\$45,380	\$46,492	\$0	\$91,872
<i>25%</i>		\$11,345	\$11,623		\$22,968
<b>TOTAL COSTS PER YEAR</b>		\$73,951	\$76,047	\$0	
<b>TOTAL COSTS FOR PROPOSED PROJECT PERIOD</b>					\$149,998

\* MTDC = Modified Total Direct Cost

JUSTIFICATION. See Exhibit B1 - Follow the budget justification instructions.

Funds Reversion Dates

06/30/2020

06/30/2021

06/30/2022

**Project Period Budget Flexibility (lesser of % or Amount)**

Prior approval required for budget changes between approved budget categories above the thresholds identified.

%

10.00%

or

Amount

\$10,000

## Exhibit B1

### Budget Justification

*The Budget Justification will include the following items in this format.*

#### Personnel

**Name.** Starting with the Principal Investigator list the names of all known personnel who will be involved on the project for each year of the proposed project period. Include all collaborating investigators, individuals in training, technical and support staff or include as "to be determined" Jay Gan (PI); Ph.D. student (TBD)

**Role on Project.** For all personnel by name, position, function, and a percentage level of effort (as appropriate), including "to-be-determined" positions.

Dr. Jay Gan will oversee the execution of this project, including experimental design, mentoring of trainees and laboratory staff, data analysis, reporting, and write of results for potential publication.

The graduate student will work under the supervision of the PI and will carry out the listed tasks including conducting experiments, sample analysis, data analysis and initial preparation of reports and/or manuscripts.

#### **Fringe Benefits.**

*In accordance with University policy, explain the costs included in the budgeted fringe benefit percentages used, which could include tuition/fee remission for qualifying personnel to the extent that such costs are provided for by University policy, to estimate the fringe benefit expenses on Exhibit B.*

Employee benefits are estimates, using the composite rates agreed upon by the University of California. Graduate student fringe benefit rates are estimated at 1.80% of their salary.

**Tuition and Fees:** In addition to fringe benefits for the GSR, University policy requires inclusion of partial fees and tuition remission and Graduate Student Health Insurance (GSHIP) for Graduate Student Researchers employed during each academic year with an appointment of 25% time or more. These are included in the budget as fringe benefits. It is estimated that the GSR will not be a California resident, and that his/her student services fees and tuition would escalate by 5% (fees) annually, 3% (tuition) per year beginning the 2017/18 academic year, and 7% (GSHIP) annually. These escalation factors are also included in the budgeted costs.

#### Travel

*Itemize all travel requests separately by trip and justify in Exhibit B1, in accordance with University travel guidelines. Provide the purpose, destination, travelers (name or position/role), and duration of each trip. Include detail on airfare, lodging and mileage expenses, if applicable. Should the application include a request for travel outside of the state of California, justify the need for those out-of-state trips separately and completely.*

The amount under Travel will be used to support the PI and the Ph.D. student (and/or other participating staff members) to make multiple trips to various urban areas in Southern California for sample collection, and to support the PI and Ph.D. student to attend the annual collaborator meeting in Davis.

#### Materials and Supplies

*Itemize materials supplies in separate categories. Include a complete justification of the project's need for these items. Theft sensitive equipment (under \$5,000) must be justified and tracked separately in accordance with State Contracting Manual Section 7.29.*

The amount under M&S will be used to purchase laboratory consumables including chemical standards, solvents, glassware, solid phase extraction cartridges, specialty gases and GC/LC columns.

#### Equipment

*List each item of equipment (greater than or equal to \$5,000 with a useful life of more than one year) with amount requested separately and justify each.*

n/a

#### Consultant Costs

*Consultants are individuals/organizations who provide expert advisory or other services for brief or limited periods and do not provide a percentage of effort to the project or program. Consultants are not involved in the scientific or technical direction of the project as a whole. Provide the names and organizational affiliations of all consultants. Describe the services to be performed, and include the number of days of anticipated consultation, the expected rate of compensation, travel, per diem, and other related costs.*

n/a

#### Subawardee (Consortium/Subrecipient) Costs

*Each participating consortium organization must submit a separate detailed budget for every year in the project period in Exhibit B2 Subcontracts. Include a complete justification for the need for any subawardee listed in the application.*

n/a

**Other Direct Costs**

*Itemize any other expenses by category and cost. Specifically justify costs that may typically be treated as indirect costs. For example, if insurance, telecommunication, or IT costs are charged as a direct expense, explain reason and methodology.*

n/a

**Rent**

*If the Scope of Work will be performed in an off-campus facility rented from a third party for a specific project or projects, then rent may be charged as a direct expense to the award.*

n/a

**Indirect (F&A) Costs**

*Indirect costs are calculated in accordance with the budgeted indirect cost rate in Exhibit B.*

Indirect costs are calculated in accordance with the University budgeted indirect cost rate in Exhibit B. Facilities and Administration costs are charged at the amount permitted by the California Department of Pesticide Regulation, which is 25% of modified total direct costs for the entire duration of this project.



### **Exhibit B3 – Invoice Elements**

#### **Invoice and Detailed Transaction Ledger Elements**

In accordance with Section 14 of Exhibit C – Payment and Invoicing, the invoice, summary report and/or transaction/payroll ledger shall be certified by the University's Financial Contact and the PI (or their respective designees).

**Summary Invoice – includes either on the invoice or in a separate summary document – by approved budget category (Exhibit B) – expenditures for the invoice period, approved budget, cumulative expenditures and budget balance available<sup>1</sup>**

- Personnel
- Equipment
- Travel
- Subawardee – Consultants
- Subawardee – Subcontract/Subrecipients
- Materials & Supplies
- Other Direct Costs
  - TOTAL DIRECT COSTS (if available from system)
- Indirect Costs
  - TOTAL

**Detailed transaction ledger and/or payroll ledger for the invoice period <sup>2</sup>**

- Univ Fund OR Agency Award # (to connect to invoice summary)
- Invoice/Report Period (matching invoice summary)
- GL Account/Object Code
- Doc Type (or subledger reference)
- Transaction Reference#
- Transaction Description, Vendor and/or Employee Name
- Transaction Posting Date
- Time Worked
- Transaction Amount

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<sup>1</sup> If this information is not on the invoice or summary attachment, it may be included in a detailed transaction ledger.

<sup>2</sup> For salaries and wages, these elements are anticipated to be included in the detailed transaction ledger. If all elements are not contained in the transaction ledger, then a separate payroll ledger may be provided with the required elements.

## Exhibit G – Negotiated Alternate UTC Terms (if applicable)

An alternate provision in Exhibit G must clearly identify whether it is replacing, deleting or modifying a provision of Exhibit C. The Order of Precedence incorporated in Exhibit C clearly identifies that the provisions on Exhibit G take precedence over those in Exhibit C.

*While every effort has been made to keep the UTC as universal in its application as possible, there may be unique projects where a given term in the UTC may be inappropriate or inadequate. California Education Code §67327(b) allows for those terms to be changed, but only through the mutual agreement and negotiation of the State agency and the University campus. If a given term in the UTC is to be changed, the change should not be noted in Exhibit C, but rather noted separately in Exhibit G.*

### 1. 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 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 the Contractor's staff from performing work under this Agreement.