Structural Pest Control Board
Research Advisory Panel

Andrew SutherlandAA ProposalAA

"Areawide IPM for nuisance ants and cockroaches in residential neighborhoods"

2025

Represented University:
UC Agriculture and Natural Resources

Funds Requested: $220,532.50

Term: January 1, 2026 through December 31, 2027

University of California
Agriculture and Natural Resources

Contracts and Grants

ANR Office of Contracts and Grants
2801 Second Street
Davis, CA 95618
(530) 750-1303 (office)
(530) 756-1148 fax
cigallegos@ucanr.edu
ocg@ucanr.edu
http://ucanr.org/contractsandgrants

July 30, 2025

Department of Consumer Affairs
Structural Pest Control Board
1625 N. Market Blvd., Suite S-103
Sacramento, CA 95834

Project entitled:…….. Areawide IPM for nuisance ants and cockroaches in residential neighborhoods
Principal Investigator:…. Dr. Andrew Sutherland
Project Dates:…….. 01/01/2026-12/31/2027
Requested Funds:…… $220,532.50

Dear Administrator,

On behalf of The Regents of the University of California, Agriculture and Natural Resources (ANR), it is our pleasure to present for your consideration the above-referenced proposal in response to your Structural Pest Control Board Research Proposal Solicitation Notice No. SPCB-25-01. The project efforts will be conducted under the supervision of Dr. Andrew Sutherland, Cooperative Extension Advisor, Alameda County.

Any questions of a programmatic nature should be directed to Dr. Sutherland at amsutherland@ucanr.edu or by phone at 510-670-5624. Questions of a contractual nature may be directed to Chantal Gallegos at cigallegos@ucanr.edu or by phone at (530) 297-8760. Correspondence may be sent to the attention of Chantal Gallegos, University of California, Agriculture and Natural Resources, Office of Contracts & Grants, 2801 Second Street, Davis, CA 95618.

Should this proposal result in an award, please issue the agreement in our legal name, The Regents of the University of California, Agriculture and Natural Resources and send it to the address in the above paragraph.

Respectfully,

Chantal Gallegos

Chantal Gallegos
Contracts and Grants Manager

ATTACHMENT 1

REQUIRED ATTACHMENT CHECKLIST

✓ Check	Attachment #	Attachment Name/Description	Form Provided	Completion Required
✓	Attachment 1	Required Attachment Checklist	YES	YES
✓	Attachment 2	Cost Proposal/Budget Display Sheets	YES	YES
✓	Attachment 3	Budget Narrative Form and Explanation of Costs	YES	YES
✓	Attachment 4	Proposer's References	YES	YES
✓	Attachment 5	Sample Agreement a) Project Summary and Scope of Work b) Schedule of Deliverables c) Key Personnel d) Authorized Representatives and Notices e) Use of Pre-existing Intellectual Property f) Current & Pending Support g) Third Party Confidential Information (if applicable) h) Budget Justification	YES	YES
✓	Attachment 6	Resumes (Curriculum Vitae) for Proposer, Proposer's staff involved in project, and all Subcontractors	NO	YES
✓	Attachment 7	Narrative of Research Objectives, as described in Rating/Scoring Criteria	NO	YES
✓	Attachment 8	Narrative of Project Direction (Work Plan and Work Schedule), as described in Rating/Scoring Criteria	NO	YES
✓	Attachment 9	Narrative of Qualifications, as described in "Minimum Qualifications for Proposers" and Rating/Scoring Criteria	NO	YES
✓	Attachment 10	Copy of current business license, professional certificates, or other Credentials	NO	YES

ATTACHMENT 2

COST PROPOSAL/BUDGET DISPLAY
RESEARCH PROPOSAL YEAR 1 – (first 12 months)

Period of award: January 1, 2026-December 31, 2026

Contractor: The Regents of the University of California

Project Title/Description: Areawide IPM for nuisance ants and cockroaches in residential neighborhoods

Description	Hours	Rate	Total
PERONNEL SERVICES			
1. Staff Research Associate II	60 % FTE	Annual Salary: $60,301.44 Benefit	$58,781
2. Classification		Rate: 59.28%	
3. Classification			
		Total Salaries	$36,904
		Total Benefits	$21,877
		Total Personnel Services (A)	$58,781
SUBCONTRACTOR SERVICES			
1. Classification			
2. Classification			
3. Classification			
		Total Subcontractor Services (B)	
OTHER SERVICES			
1. Pest Control Operators (3 Vendors)		$1,000 per residential site $4,000 per	$36,000
2. Classification		institutional site	
3. Classification			
		Total Other Services (C)	$36,000
OPERATING EXPENSES			
1. Supplies and Expense			$3,000
2. Travel In-State			$12,000
3. Travel Out-of-State			
4. Equipment			
5. Other Costs			$730
		Total Operating Expenses (D)	$15,730
Total Personnel and Operating (Add A through D)		$110,511	
Indirect Costs (detail)		$27,627.75	
TOTAL COSTS – Year 1 (for the first 12 months)		$138,138.75	

ATTACHMENT 2, Cont.

COST PROPOSAL/BUDGET DISPLAY RESEARCH
PROPOSAL YEAR 2 – (months 13 thru 24)

Period of award: January 01, 2027 – December 31, 2027

Contractor: The Regents of the University of California

Project Title/Description: Areawide IPM for nuisance ants and cockroaches in residential neighborhoods

Description	Hours	Rate	Total
PERONNEL SERVICES			
4. Staff Research Associate II	60%	Annual Salary: $62,713 Benefit	$61,133
5. Classification		Rate: 59.28%	
6. Classification			
		Total Salaries	$38,381
		Total Benefits	$22,752
		Total Personnel Services (A)	$61,133
SUBCONTRACTOR SERVICES			
4. Classification			
5. Classification			
6. Classification			
		Total Subcontractor Services (B)	
OTHER SERVICES			
4. Classification			
5. Classification			
6. Classification			
		Total Other Services (C)	
OPERATING EXPENSES			
6. Supplies and Expense			$1,000
7. Travel In-State			$3,000
8. Travel Out-of-State			
9. Equipment			
10. Other Costs			$782
		Total Operating Expenses (D)	$4782
Total Personnel and Operating (Add A through D)		$65,915	
Indirect Costs (detail)		$16,478.75	
TOTAL COSTS – Year 2 (for 12 months)		$82,393.75	

ATTACHMENT 2

Principal Investigator: Andrew Sutherland **Exhibit B**

	01/01/2026	COMPOSITE BUDGET: ESTIMATE FOR ENTIRE PROPOSED PROJECT PERIOD to

From: / To: / BUDGET CATEGORY	1/1/2026 12/31/2026 Year 1	1/1/2027 12/31/2027 Year 2	TOTAL
PERSONNEL: *Salary and fringe benefits.*	$58,781	$61,133	$119,914
TRAVEL	$12,000	$3,000	$15,000
MATERIALS & SUPPLIES	$3,000	$1,000	$4,000
CONSULTANT	$36,000	$0	$36,000
OTHER DIRECT COSTS (ODC)			
GAEL	$730	$782	$1,512
TOTAL DIRECT COSTS	**$110,511**	**$65,915**	**$176,426**
Indirect (F&A) Costs (25%)			
Research - Off Campus **F&A Base**	$27,627.75	$16,478.75	**$44,106.50**
TOTAL ESTIMATED COSTS PER YEAR	**$138,138.75**	**$82,393.75**	
TOTAL ESTIMATED COSTS FOR PROPOSED PROJECT PERIOD			**$220,532.50**

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

ATTACHMENT 2

EXHIBIT B-1

BUDGET JUSTIFICATION

Personnel

Andrew Sutherland, Principal Investigator. Urban IPM Advisor, University of California (UCCE Alameda, UC IPM). Dr. Sutherland will provide leadership and overall management of the project, supervise research staff, design experiments and data collection efforts, and oversee field-based research activities with collaborating pest control operators and property owners. Dr. Sutherland will also lead efforts to draft and develop outreach materials, publications, and presentations associated with the project. 20% effort provided (in-kind); no salary requested.

Staff Research Associate II (to be determined). SRA, UCCE Alameda. The staff research associate (SRA) will coordinate and lead all field activities. Specific duties will include the establishment of field sites, coordination and communication with collaborating pest control operators and property owners, data collection and stewardship, and direct reporting to Dr. Andrew Sutherland. 60% effort provided; 60% of full-time salary and associated benefits requested:

Year 1: January 1, 2026 – December 31, 2026: $ 36,904 (60% of $60,301.44)
Year 2: January 1, 2027 – December 31, 2027: $ 38,381 (60% of $62,713.00)

Fringe Benefits: 59.28% of salary:

Year 1: $ 21,877
Year 2: $ 22,752

Total: **$ 119,914**

Travel

Year 1: $ 12,000

Eight field site visitation circuits will be conducted between March 1 and October 31. Field sites will be located in Contra Costa, Sacramento, and Riverside counties. Each of these field site circuits will include roundtrip airfare between Oakland and Riverside, two nights lodging, three days of meals and incidental costs, approximately 300 miles of mileage reimbursement, three days of car rental, and approximately ten bridge tolls. In addition, several reconnaissance trips will be made between January 1 and March 1 to establish field sites. These trips will be primarily made by the SRA but may also include the PI and local collaborators.

Year 2: $ 3,000

Two field site visitation circuits will be conducted between March 1 and October 31. Field sites will be located in Contra Costa, Sacramento, and Riverside counties. Each of these field site circuits will include roundtrip airfare between Oakland and Riverside, two nights lodging, three days of meals and incidental costs, approximately 300 miles of mileage reimbursement, and approximately ten bridge tolls. These trips will be primarily made by the SRA but may also include the PI and local collaborators. In addition, one extension and outreach trip will be conducted during March 2027 to the UC Riverside Urban Pest Management Conference. This trip will be conducted by the PI and will include roundtrip airfare between Oakland and Riverside, one night lodging, two days of meals and incidental costs, approximately 50 miles of mileage reimbursement, one day of car rental, and one night of parking fees.

There will be no out-of-state travel associated with this project.

Materials and Supplies

Supplies associated with field activities will include plastic monitoring stations, centrifuge tubes, adhesive traps, fasteners, pliers, gloves, boots, protective eyewear and headwear, utility coveralls, backpacks, clipboards, notebooks, writing utensils, forceps, plastic collection vials, and plastic bags. Supplies associated with laboratory activities will include ethanol, glass vials, and disposable gloves. Supplies

during both Year 1 and Year 2 will be associated with field activities and lab activities, but costs in Year 1 are proposed as three times higher due to the higher frequency of field visits.

Consultant Costs

Three pest control operator (PCO) companies have agreed to participate in this project. Starting with existing residential or neighborhood accounts, PCOs will identify and secure additional properties at which to conduct this research. Research stipends in the amount of $12,000 will be provided to each of these three companies to offset operational costs incurred via participation in this project and to incentivize residential property owners to participate in the areawide IPM demonstrations. Each company will provide three single-family homes, one residential "cluster" of five homes, and one institutional campus or neighborhood. Stipends are designed to cover all costs for three quarterly general pest services for the eight residential properties ($ 1,000 per site) and one institutional property ($4,000) included in the study.

Other Direct Costs

GAEL (General, Auto, and Employee Liability) is a self-insurance program managed by the University of California (UC) system. It covers various liability risks for UC departments, employees, and other covered individuals. The program is funded through annual assessments, with rates based on actuarial analysis of claims history.

Indirect (F&A) Costs

Indirect costs were calculated in accordance with the budgeted indirect cost rate in Exhibit B: 25%.

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.

State Agency Contacts	University Contacts
Agency Name: Integrated Pest Management	University Name: University of California
Contract Project Manager (Technical) Name: James Jay Farrar, Director Statewide IPM Program Address: 2809 2nd Street, Davis, CA 95618 Telephone: 530-750-1249 Fax: N/A Email: jjfarrar@ucanr.edu	***Principal Investigator*** Name: Andrew Sutherland, IPM Advisor Address: 224 West Winton Ave, #134 Hayward, CA 94544 Telephone: 510-670 5624 Fax: N/A Email: amsutherland@ucanr.edu Designees to certify invoices under Section 14 of Exhibit C on behalf of PI: 1. Katherine Hanke, BOC Supervisor, kahanke@ucanr.edu 2. Melanie Weir, UCCE Alameda Office Manager, mwau@ucanr.edu 3. Tracy Roman, BOC Coordinator, tlroberts@ucanr.edu

Authorized Official (contract officer) Name: Chantal Irene Gallegos Address: 2801 Second Street, Davis, CA 95618 Telephone: Fax: Email: cigallegos@ucanr.edu ***Send notices to (if different):*** Name: Address: <Department> <Address> <City,State,Zip> elephone:	

Email: mwau@ucanr.edu	Email: <EmailAddress>
Administrative Contact Name: Melanie Weir, Office Manager Address: UCCE Alameda County 224 West Winton, Ca 94544 Hayward, CA 94544 Telephone: **(530) 278-5302** Fax: Email: mwau@ucanr.edu	***Administrative Contact*** Name: Andrew Miller Area Director Address: 224 West Winton, #134 Hayward, CA 94544 Telephone: 415-936- 9688 Fax: Email: ammil@ucanr.edu
	Authorized Financial Contact/Invoicing Name: Lenora Ann Bruce UC ANR Finance Contracts & Grants: Accounting Address: 2801 Second Street, Davis, CA 95618 Telephone: 530-752-5618 Fax: Email: labruce@ucdavis.edu Designees for invoice certification in accordance wi Section 14 of Exhibit C on behalf of the Financial Contact: 1. <Name>, <Title>, <EmailAddress> 2. <Name>, <Title>, <EmailAddress> 3. <Name>, <Title>, <EmailAddress>

ATTACHMENT 4

PROPOSER REFERENCES

1. Please attach three letters of reference on company letterhead.
2. List below three references of similar types of services performed, as described in the description of services, within the last five years. If three references cannot be provided, please explain why on an attached sheet of paper.

REFERENCE 1	
Name of Firm	Omega Termite & Pest Control
Address	807 75th Avenue Oakland, California 94621
Contact Person	Allen Robert Kanady
Telephone Number	(510) 562-1333
Dates of Service	January 2018 – December 2022; ongoing consultation
Value or Cost of Service	~ $ 10,000

Brief Description of Service Provided:

Field Research support as part of sponsored research on use of bait stations against subterranean termites in the SF Bay Area.

REFERENCE 2	
Name of Firm	Smith's Pest Management
Address	1931 O'Toole Way San Jose, CA
Contact Person	Zach Smith
Telephone Number	408-771-6428
Dates of Service	Ongoing consultation
Value or Cost of Service	Unknown…provided as part of Cooperative Extension duties

Brief Description of Service Provided:

Consultation on IPM protocols and treatment materials for use against Argentine ants, paper wasps, peridomestic cockroaches.

REFERENCE 3	
Name of Firm	Pestec IPM providers, Inc.
Address	3450 3rd St Suite 3F, San Francisco, CA 94124
Contact Person	Luis Agurto, Jr.
Telephone Number	(925) 584-8844
Dates of Service	Ongoing consultation
Value or Cost of Service	Unknown…provided as part of Cooperative Extension duties

Brief Description of Service Provided:

Collaborative research on bed bugs and cockroaches. Ongoing consultation on biting mites, other general pests.

STATE OF CALIFORNIA

STANDARD AGREEMENT

STD 213 (Rev 06/03)

ATTACHMENT 5 – SAMPLE AGREEMENT

AGREEMENT NUMBER	
REGISTRATION NUMBER	

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

STATE AGENCY'S NAME

Department of Consumer Affairs, Structural Pest Control Board

CONTRACTOR'S NAME

TBD

2. The term of this Agreement is: July 1, 2025 (or upon approval, whichever is later) through **TBD**

3. The maximum amount of this Agreement is: $

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 – **A7**: A–Scope of Work; A1–Deliverables; A2–Key Personnel; A3–Authorized Representatives; A4–Use of Intellectual Property; A5–Resumes; A6–Current & Pending Support; A7-Third Party Confidential Information (if applicable) page(s)

Exhibit B – B–Budget; B1–Budget Justification; B2– Subawardee Budgets (if applicable); B3–Invoice Elements page(s)

Exhibit C* – University Terms and Conditions 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 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

CONTRACTOR'S NAME *(if other than an individual, state whether a corporation, partnership, etc.)*

BY *(Authorized Signature)* ✍ | DATE SIGNED *(Do not type)*

PRINTED NAME AND TITLE OF PERSON SIGNING

ADDRESS

STATE OF CALIFORNIA

AGENCY NAME

Department of Consumer Affairs, Structural Pest Control Board

BY *(Authorized Signature)* ✍ | DATE SIGNED *(Do not type)*

PRINTED NAME AND TITLE OF PERSON SIGNING

ADDRESS

1625 N. Market Blvd., Suite S-103
Sacramento, CA 95834

California Department of General Services Use Only

Exhibit A – Scope of Work

Project Summary & Scope of Work

☐ Contract ✓ Grant

PI Name: *Andrew M Sutherland*

Project Title: *Areawide IPM for nuisance ants and cockroaches in residential neighborhoods*

Project Summary/Abstract

Outdoor-nesting ants and peridomestic cockroaches are considered nuisances when they invade structures; as such, they are frequent targets of general pest control services. Unfortunately, these services often fail to control the pests since they focus on individual properties and because the targeted insects remain on adjacent properties, representing reservoirs for future invasions. Furthermore, general pest programs often rely on liquid insecticides applied as residual barriers around structures, and the most common active ingredients for such applications are regulated in California as surface water contaminants. Areawide integrated pest management (IPM) focuses on larger neighborhood-scale treatment areas instead of individual homes. Areawide IPM; in which target pests, control strategies, and specific control tactics are considered and implemented over a large contiguous area, is increasingly common and considered very effective in agricultural systems. In urban systems, areawide IPM has been successfully demonstrated for mosquitoes, ticks, and subterranean termites. Intuitively, areawide IPM programs, especially targeting pests with high dispersal rates or large foraging ranges, should lead to improved pest control, but, in practice, the concept is rarely investigated due to the competitive marketplace and patchwork client portfolios found in the structural pest control industry. Economic benefits may be realized, as well, since travel and communication time could be reduced for the pest control operator, and the resulting economy-of-scale may reduce service costs for the consumer. Working collaboratively with pest control operators (PCOs), we propose to demonstrate areawide IPM for Argentine ants and Turkestan cockroaches in California's residential neighborhoods. These common pests are difficult to control since they exist as widespread supercolonies (Argentine ants) or because they forage great distances from harborage locations (Turkestan cockroaches). We hypothesize that pest incidence and density, as measured by established monitoring practices in the center of research plots, will be inversely correlated with the size of the treatment area. In other words, the larger the focus and scope of the treatment, the smaller the pest population will be. We propose to test this hypothesis across three treatment sizes: one single-family home property (≤ 10,000 ft2), one contiguous "cluster" of five single family home properties (35,000 – 50,000 ft2), and one institutional, industrial, or business "campus" (≥ 50,000 ft2). We will institute a multi-tactical IPM program at these sites that includes 1) baiting within self-contained stations, and 2) targeted "spot treatments" to known nests, suspected harborages, and specific structural invasion locations. We will demonstrate these programs and collect population data between March 1 and October 31, 2026. During this demonstration period, there will be at least three service visits (by participating PCO) and three monitoring visits (by UC team) made to each site, with treatments made as needed (by participating PCO). Data to be collected include pest incidence, pest density, pesticide products and amounts used, estimated service values, and customer satisfaction (as per callback data and survey data). Research stipends in the amount of $12,000 will be provided to each of these three companies to offset operational costs incurred via participation in this project and to incentivize residential property owners to participate in the areawide IPM demonstrations. Each company will provide three single-family homes, one residential "cluster" of five homes, and one institutional campus or neighborhood. Stipends are designed to cover all costs for three general pest service visits at each of the eight residential properties ($ 1,000 per site) and the one institutional 'campus' property ($4,000) included in the study. We hypothesize that pest incidence and density will decrease as the treatment sizes increase. We also expect that liquid insecticide use over space and time (and the associated potential for surface water contamination) will be decreased as compared to conventional programs. Finally, we expect that residential customers will be more satisfied with the results of these programs than conventional programs.

Please see attachments 7 (Research Objectives) and 8 (Project Direction) for details

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.

Deliverable	Description	Due Date
Interim progress report	Provide a brief (2-3 pages) written interim progress report to address progress made, findings to date, and problems encountered.	March 31, 2026
Progress report presentation	Present a progress report at one Board Meeting	TBD (2026)
Interim progress report	Provide a brief (2-3 pages) written interim progress report to address progress made, findings to date, and problems encountered.	March 31, 2027
Progress report presentation	Present a progress report at one Board Meeting	TBD (2027)
Final Report	Provide a comprehensive written Final Report	December 15, 2027
Final presentation	Present a final report at one Board Meeting	TBD (2028)

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
PI:		
Sutherland, Andrew Mason	*University of California (UCCE Alameda, UC IPM)*	*Manager, supervisor, leader, designer, reporter*
Co-PI(s) – if applicable:		
Taravati, Siavash	*University of California (UCCE Riverside, UC IPM)*	*Secondary manager, supplementary academic oversight and supervision of staff*
Other Key Personnel (if applicable):		
To Be Determined (staff research associate to be hired with this funding)	*University of California (UCCE Alameda, UC IPM)*	*Project manager, field site liaison, data collector and organizer*

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.

State Agency Contacts	**University Contacts**
Agency Name: Integrated Pest Management	University Name: University of California
Contract Project Manager (Technical) Name: James Jay Farrar, Director Statewide IPM Program Address: 2809 2nd Street, Davis, CA 95618 Telephone: 530-750-1249 Fax: N/A Email: jjfarrar@ucanr.edu	***Principal Investigator*** Name: Andrew Sutherland, IPM Advisor Address: 224 West Winton Ave, #134 Hayward, CA 94544 Telephone: 510-670 5624 Fax: N/A Email: amsutherland@ucanr.edu Designees to certify invoices under Section 14 of Exhibit C on behalf of PI: 1. Katherine Hanke, BOC Supervisor, kahanke@ucanr.edu 2. Melanie Weir, UCCE Alameda Office Manager, mwau@ucanr.edu 3. Tracy Roman, BOC Coordinator, tlroberts@ucanr.edu

Authorized Official (contract officer) Name: Chantal Irene Gallegos Address: 2801 Second Street, Davis, CA 95618 Telephone: Fax: Email: cigallegos@ucanr.edu ***Send notices to (if different):*** Name: Address: <Department> <Address> <City,State,ZipT elephone:	

Email: mwau@ucanr.edu	Email: <EmailAddress>
Administrative Contact Name: Melanie Weir, Office Manager Address: UCCE Alameda County 224 West Winton, Ca 94544 Hayward, CA 94544 Telephone: **(530) 278-5302** Fax: Email: mwau@ucanr.edu	***Administrative Contact*** Name: Andrew Miller Area Director Address: 224 West Winton, #134 Hayward, CA 94544 Telephone: 415-936- 9688 Fax: Email: ammil@ucanr.edu
	Authorized Financial Contact/Invoicing Name: Lenora Ann Bruce UC ANR Finance Contracts & Grants: Accounting Address: 2801 Second Street, Davis, CA 95618 Telephone: 530-752-5618 Fax: Email: labruce@ucdavis.edu Designees for invoice certification in accordance with Section 14 of Exhibit C on behalf of the Financial Contact: 1. <Name>, <Title>, <EmailAddress> 2. <Name>, <Title>, <EmailAddress> 3. <Name>, <Title>, <EmailAddress>

Exhibit A4 – Use of Intellectual Property

USE OF INTELLECTUAL PROPERTY

No Restrictions on this Project

RÉSUMÉ/BIOSKETCH

See ATTACHMENT 6

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: Andrew Sutherland

Status (currently active or pending approval)	Award # (if available)	Source (name of the sponsor)	Project Title	Start Date	End Date
Proposed Project	TBD	Structural Pest Control Board	Areawide IPM for nuisance ants and cockroaches in residential neighborhoods	January 1, 2026	December 31, 2027
CURRENT	4400008437	County of Santa Clara	Educational IPM Video Production for the County of Santa Clara	11/18/22	12/31/25

Siavash Taravati

Status	Award #	Source	Project Title	Start Date	End Date
Proposed Project	TBD	Structural Pest Control Board	Areawide IPM for nuisance ants and cockroaches in residential neighborhoods	January 1, 2026	December 31, 2027
CURRENT		CA DEPARTMENT OF PESTICIDE REGULATION (DPR)	Bridging the Gap in IPM Training for Low-Income Housing.	09/01/2025	06/30/2028
CURRENT		CA DEPARTMENT OF PESTICIDE REGULATION (DPR)	Reinventing Integrated Pest Management System for Wood-Destroying Insects	09/01/2025	06/30/2028

Exhibit A7

Third Party Confidential Information

Confidential Nondisclosure Agreement

(Identified in Exhibit A, Scope of Work – will be incorporated, if applicable)

If the Scope of Work requires the provision of third party confidential information to either the State or the Universities, then any requirement of the third party in the use and disposition of the confidential information will be listed below. The third party may require a separate Confidential Nondisclosure Agreement (CNDA) as a requirement to use the confidential information. Any CNDA will be identified in this Exhibit A7.

Not applicable to this proposal…

EXHIBIT B

BUDGET FOR PROJECT PERIOD

Principal Investigator: Andrew Sutherland

Exhibit B

	01/01/2026	COMPOSITE BUDGET: ESTIMATE FOR ENTIRE PROPOSED PROJECT PERIOD to

From: / To: / BUDGET CATEGORY	1/1/2026 12/31/2026 Year 1	1/1/2027 12/31/2027 Year 2	TOTAL
PERSONNEL: *Salary and fringe benefits.*	$58,781	$61,133	$119,914
TRAVEL	$12,000	$3,000	$15,000
MATERIALS & SUPPLIES	$3,000	$1,000	$4,000
CONSULTANT	$36,000	$0	$36,000
OTHER DIRECT COSTS (ODC)			
GAEL	$730	$782	$1,512
TOTAL DIRECT COSTS	**$110,511**	**$65,915**	**$176,426**
Indirect (F&A) Costs (25%)			
Research - Off Campus **F&A Base**	$27,627.75	$16,478.75	**$44,106.50**
TOTAL ESTIMATED COSTS PER YEAR	**$138,138.75**	**$82,393.75**	
TOTAL ESTIMATED COSTS FOR PROPOSED PROJECT PERIOD			**$220,532.50**

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

EXHIBIT B-1

BUDGET JUSTIFICATION

Personnel

Andrew Sutherland, Principal Investigator. Urban IPM Advisor, University of California (UCCE Alameda, UC IPM). Dr. Sutherland will provide leadership and overall management of the project, supervise research staff, design experiments and data collection efforts, and oversee field-based research activities with collaborating pest control operators and property owners. Dr. Sutherland will also lead efforts to draft and develop outreach materials, publications, and presentations associated with the project. 20% effort provided (in-kind); no salary requested.

Staff Research Associate II (to be determined). SRA, UCCE Alameda. The staff research associate (SRA) will coordinate and lead all field activities. Specific duties will include the establishment of field sites, coordination and communication with collaborating pest control operators and property owners, data collection and stewardship, and direct reporting to Dr. Andrew Sutherland. 60% effort provided; 60% of full-time salary and associated benefits requested:

Year 1: January 1, 2026 – December 31, 2026: $ 36,904 (60% of $60,301.44)
Year 2: January 1, 2027 – December 31, 2027: $ 38,381 (60% of $62,713.00)

Fringe Benefits: 59.28% of salary:

Year 1: $ 21,877
Year 2: $ 22,752

Total: **$ 119,914**

Travel

Year 1: $ 12,000

Eight field site visitation circuits will be conducted between March 1 and October 31. Field sites will be located in Contra Costa, Sacramento, and Riverside counties. Each of these field site circuits will include roundtrip airfare between Oakland and Riverside, two nights lodging, three days of meals and incidental costs, approximately 300 miles of mileage reimbursement, three days of car rental, and approximately ten bridge tolls. In addition, several reconnaissance trips will be made between January 1 and March 1 to establish field sites. These trips will be primarily made by the SRA but may also include the PI and local collaborators.

Year 2: $ 3,000

Two field site visitation circuits will be conducted between March 1 and October 31. Field sites will be located in Contra Costa, Sacramento, and Riverside counties. Each of these field site circuits will include roundtrip airfare between Oakland and Riverside, two nights lodging, three days of meals and incidental costs, approximately 300 miles of mileage reimbursement, and approximately ten bridge tolls. These trips will be primarily made by the SRA but may also include the PI and local collaborators. In addition, one extension and outreach trip will be conducted during March 2027 to the UC Riverside Urban Pest Management Conference. This trip will be conducted by the PI and will include roundtrip airfare between Oakland and Riverside, one night lodging, two days of meals and incidental costs, approximately 50 miles of mileage reimbursement, one day of car rental, and one night of parking fees.

There will be no out-of-state travel associated with this project.

Materials and Supplies

Supplies associated with field activities will include plastic monitoring stations, centrifuge tubes, adhesive traps, fasteners, pliers, gloves, boots, protective eyewear and headwear, utility coveralls, backpacks, clipboards, notebooks, writing utensils, forceps, plastic collection vials, and plastic bags. Supplies associated with laboratory activities will include ethanol, glass vials, and disposable gloves. Supplies during both Year 1 and Year 2 will be associated with field activities and lab activities, but costs in Year 1 are proposed as three times higher due to the higher frequency of field visits.

Consultant Costs

Three pest control operator (PCO) companies have agreed to participate in this project. Starting with existing residential or neighborhood accounts, PCOs will identify and secure additional properties at which to conduct this research. Research stipends in the amount of $12,000 will be provided to each of these three companies to offset operational costs incurred via participation in this project and to incentivize residential property owners to participate in the areawide IPM demonstrations. Each company will provide three single-family homes, one residential “cluster” of five homes, and one institutional campus or neighborhood. Stipends are designed to cover all costs for three quarterly general pest services for the eight residential properties ($ 1,000 per site) and one institutional property ($4,000) included in the study.

Other Direct Costs

GAEL (General, Auto, and Employee Liability) is a self-insurance program managed by the University of California (UC) system. It covers various liability risks for UC departments, employees, and other covered individuals. The program is funded through annual assessments, with rates based on actuarial analysis of claims history.

Indirect (F&A) Costs

Indirect costs were calculated in accordance with the budgeted indirect cost rate in Exhibit B: 25%.

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[1]

- 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 [2]

- 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

[1] If this information is not on the invoice or summary attachment, it may be included in a detailed transaction ledger.

[2] 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 C – University Terms and Conditions

CMA (AB20) State/University Model Agreement Terms & Conditions 518

https://www.ucop.edu/research-policy-analysis-coordination/_files/cma_documents/exhibit-c_utc-220_feb_2020.pdf

ATTACHMENT 6

Curriculum Vitae: Andrew M. Sutherland

Education

Ph.D. Entomology; June 2009; University of California, Davis
M.S. Horticulture and Agronomy; June 2005; University of California, Davis
B.S. Environmental Horticulture; December 2001; University of Florida

Licenses and Certifications

- Board Certified Entomologist (BCE), in Urban & Industrial Entomology and Plant-Related Entomology, certified by the Entomological Society of America, since July 2012
- Qualified Applicator's License (QAL), in Category J: Demonstration and Research, licensed by the California Department of Pesticide Regulation, since June 2012

Current Employment:

- ***SF Bay Area Urban Integrated Pest Management Advisor*, University of California**
- University of California Statewide Integrated Pest Management Program, Division of Agriculture and Natural Resources (UC IPM, UC ANR)
- April 2012 to present, 100% extension appointment
- Programmatic web site: https://ucanr.edu/sites/urbanIPM/

Selected Peer-Reviewed Publications (during the previous three years)

- Chen, J. T.-C., Nelson, L., Rugman-Jones, P.F., Tseng, S.-P., **Sutherland, A.M.**, Choe, D.-H., Haverty, M.I., Lee, C.-Y. 2025 Description of a new species of subterranean termite in the genus Reticulitermes (Blattodea: Heterotermitidae) from southern California, Annals of the Entomological Society of America, 2025;, saaf019, https://doi.org/10.1093/aesa/saaf019
- Bustamante, J., Jr., Liu, P., Campbell, K., **Sutherland, A.M.**, Choe, D.-H., Loudon, C. 2025. A novel leaf-derived trapping material is more effective at capturing common bed bugs (Hemiptera: Cimicidae) than selected commercial monitoring devices. Insects 2025, 16, 362. https://doi.org/10.3390/insects16040362
- Tseng, S-P., Nelson, L.J., Hubble, C.W., **Sutherland, A.M.**, Haverty, M.I., Lee, C-Y. 2023. Phylogenetic analyses of Reticulitermes (Blattodea: Rhinotermitidae) from California and other western states: multiple genes confirm undescribed species identified by cuticular hydrocarbons. Journal of Economic Entomology 116(6), 2135 – 2145; https://doi.org/10.1093/jee/toad182
- Rust, M.K., Lee, C-Y., Park, H.E., Campbell, K., Choe, D-H., Sorensen, M., **Sutherland, A.**, Hubble, C., Nobua-Behrmann, B., Kabashima, J., Tseng, S-P., Post, L. 2023. The potential of fluralaner as a bait toxicant to control pest yellowjackets in California. Insects 14(4), 311; https://www.mdpi.com/2075-4450/14/4/311
- **Sutherland, A.M**.; Hubble, C.; Barber, M. 2022. Installation season may significantly impact time required for subterranean termites to find and feed on in-ground baits. Insects 13(5), 445; https://doi.org/10.3390/insects13050445

Patents

1. McCabe, K.J., Wingo, R.M., Haarmann, T.K., **Sutherland, A.M.**, Gubler, W.D. US Patent #9210914: 'Method for training honeybees to respond to olfactory stimuli', Issued 12/15/2015.

Selected Curriculum and Educational Products

- Taravati, S., Haver, D.L., **Sutherland, A.M.** 2023. *Pest Notes: Hiring a Pest Control Company.* UC ANR Publication 74125 (revised), published August 2023: https://ipm.ucanr.edu/PMG/PESTNOTES/pn74125.html
- *Integrated Pest Management*, 2022. Initial training for UCCE Master Gardener trainees, video-based module with embedded quizzes, group exercises, and homework: https://drive.google.com/drive/folders/1-fXk1Nodg1N3QVMRkqE2k1P36YfnNhVL. March 2022.
- *Recognize, restrict, and report bed bugs*, 2020. State-funded online training program and interactive educational "game" for residents within California's multi-unit rental housing environments: https://www.stopbedbugs.org/. March 2020.
- *Integrated Pest Management Toolkit for Family Child Care Homes,* UCSF California Childcare Health Program, UC IPM, California Department Pesticide Regulation, 2016. In-person & online curriculum: http://cchp.ucsf.edu/content/family-child-care-homes
- *Providing IPM services to schools and child care centers*, Bradman, A., **Sutherland, A.M.**, 2015. Online CE curriculum hosted by UC IPM: http://ipm.ucanr.edu/training/index.html

Authored Grant Proposals Awarded (last five years)

- County of Santa Clara, sponsored contract ($180,000; *Educational video production to support IPM education and evaluation*; December 2023 – ongoing)
- California Department of Pesticide Regulation (CDPR), Pest Management Research Program ($165,721; *Biting Mites in Homes and Structures*; July 2022 – June 2025)
- CDPR, Pest Management Alliance Program ($91,563, *Development of an interactive training facility for pest management professionals*, October 2020 – June 2023)
- CDPR, Pest Management Research Program ($56,913, *First investigations into the biology and management of an invasive cockroach species*, July 2020– June 2023)

Leadership and Committee Service

- UC ANR Associate Editor (Pest Management – Urban), September 2013 – present
- Contra Costa County's IPM Advisory Committee, November 2015 – June 2022, January 2024 - present
- UC ANR Strategic Initiative Advisory Panel (Endemic and Invasive Pests and Diseases) July 2019 – December 2023
- Entomological Society of America: Certification Board, Dec 2013 – Dec 2023
- UC ANR Master Gardener Program: Statewide Steering Committee, July 2013 – June 2022
- UC ANR Pest Management Program Team leader, April 2015 – September 2018
- California's Structural Pest Control Board (Department of Consumer Affairs): Continuing Education Committee, voting member, July 2014 – June 2016

Siavash Taravati – CV

Area IPM advisor
University of California, Division of Agriculture and Natural Resources
UCCE-Riverside
2980 Washington St. Riverside, CA 92504
e-mail: staravati@ucanr.edu

EDUCATION

- Ph.D. in Entomology, University of Florida, Department of Entomology and Nematology (2015)
- M.Sc. in Biology, Ferdowsi University of Mashhad, Mashhad, Iran (2009)
- B.Sc. in Biology, Faculty of Science, University of Tehran, Tehran, Iran (2006)

LICENSES

- **Qualified Applicator License –** California Department of Pesticide Regulation (2017-present)
  - License number: 144424
- **Field Representative License, Branch II** – Structural Pest Control Board (2021-present)
  - License number: 60650

WORK EXPERIENCE

Integrated Pest Management (IPM) Advisor: 2015-present
University of California Division of Agriculture and Natural Resources (UCANR) – UCCE-Los Angeles & Riverside Counties

- **IPM Practices**: Promote IPM practices among my clientele, including pest management professionals, applicators, Pest Control Advisors (PCAs), and public housing staff and managers.
- **Regulatory activities:** Provide consultation to the pest control industry and regulatory agencies (CDPR, SPCB) on various regulatory matters, such as regulatory compliance, proposed state and Federal regulations and policies on pesticide bans, priority pesticides, needs assessment surveys, etc.
- **Research:** Conduct research on sustainable pest management for termites, ants, cockroaches, bed bugs, fleas, mosquitoes, and other urban pests.
- **Extension:**
  - Educate my clientele about the latest scientific findings on IPM and Sustainable Pest Management (SPM), including the latest pesticides, traps, and other tools.
  - Educate public housing tenants about managing persistent pests such as bed bugs and German cockroaches.
- **Multi-county responsibilities:** Covered a large area of SoCal, including Los Angeles, Orange, Riverside, San Bernardino, and surrounding counties. Collaborated with various public and private stakeholders in each country.
- **Statewide responsibilities:**
  - Statewide collaborations and staff management on various IPM projects and goals
  - Member of the UC Statewide IPM team, organizing meetings, workshops, and cross-regional collaborations.
- **Leadership roles:**
  - Initiating and leading multi-agency collaborations
  - Leading IPM and SPM training, research teams, and projects
- **Management:**
  - Hired and managed full-time and part-time staff and volunteers
- **Collaborative efforts:**
  - Work with a diverse stakeholder
  - Multi-county, statewide, and national collaborations
  - Multi-agencies collaborations including working with the pesticide manufacturers, pest control companies, the Structural Pest Control Board, CDPR, political lobbies, politicians, agricultural commissioner's offices, housing authorities, HUD, mosquito and vector control districts, public schools, county deputies, city and county staff, etc.

- **Budget planning and management of state and county funds**
- **Administrative/Supervisory role:**
  - Principal investigator of many projects, leading teams, staff, and volunteer management, and policy-making for cities, counties, and the state.
  - Serving on university and state committees.
- **Selected project management examples:**
  - 2015-2023 (many instances): Led and organized regional training for public housing employees on managing pests in four SoCal counties.
  - 2015-2017: Conducting a multi-county needs assessment survey on SoCal pest management professionals
  - 2017 & 2020: Organized pesticide run-off mitigation workshops for the pest control industry in the Santa Clarita area funded by CDPR and Pyrethroid Working Group
  - 2017-2018: Helping California public schools with Red Imported Fire Ant management using granular baits
  - 2017-2018: Managing the Turkestan cockroach at California public schools
  - 2018-2020: Western subterranean termite baiting study using insect growth regulators funded by the Structural Pest Control Board.
  - 2023-present: Baiting study on the dark rover ant, a new invasive ant in California
  - 2023-present: Evaluating the efficacy of gravid female mosquito traps for managing the yellow fever mosquito (*Aedes aegypti*)
- **Diversity & Inclusion:**
  - Co-chair of UCANR's People of Color Employment Resource Group (POC ERG)
  - Experience in affirmative action data collection, analysis, and reporting, including parity analysis and all reasonable efforts.
  - Delivered multi-cultural and multi-lingual training to BIPOC and Historically Underrepresented Minorities
  - Formed diverse hiring committees
  - Organized educational meetings for underserved communities

Research assistant (Entomology): 2011-2015
University of Florida-Tropical Research and Education Center-Homestead, FL

- **Integrated Pest Management (IPM)** for landscape and agricultural pests
- Growing and maintaining ornamental and crop plants in greenhouse and open fields
- Rearing pests and natural enemies in greenhouses and outdoors
- Insecticide efficacy trials
- Lab and field bioassays: petri-dish, cage, landscape, and field studies
- Survival bioassays
- **Supervisory role:** Supervised two full-time and three part-time staff, mentored five undergraduates
- Designing and developing a website for UFL's "Avocado IPM" program
- Scientific photo edits and organizing scientific content

Research assistant (Animal Biosystematics): 2006-2009; Ferdowsi University of Mashhad, Mashhad, Iran

- Taxonomy of darkling beetles
- Shape analysis (Geometric morphometrics)
- Teaching undergraduate and graduate students on biology, data management, and shape analysis
- VB.NET Programming
- Rodent trapping methods in urban and rural areas

Member of a consultant team for environmental impact assessment of the Persian Liquified Natural Gas Project (PLNG)-2006
Rouyan Co., Tehran, Iran

- Assessment of the arthropod diversity in the South Pars LNG onshore territory

Trainee and voluntary collaborative researcher 2004-2006, Hayk Mirzayans Insect Museum (HMIM), Iranian Research Institute of Plant Protection, Tehran, Iran

- Insect identification, mounting, labeling & genital dissection
- Store product and invasive species identification
- General taxonomic methods
- Insect museum maintenance

SCHOLARSHIPS & AWARDS

- *IPM Achievement Award* – 2021-2022
  The California Department of Pesticide Regulation – Sacramento, CA
- *Graduate student of the year award* - 2015
  UF-IFAS-Tropical Research and Education Center – Homestead, FL
- *Ph.D student oral presentation award* – 2014
  Florida Entomological Society meeting, Jupiter, FL
- *L. Russell Norton Memorial Fellowship* – 2014
  Dade County AgriCouncil
- *Seymour Goldweber Scholarship* – 2013
  Dade County AGRI-Council Scholarship

PATENTS & COPYRIGHTED CONTENTS

- **Geometric Morphometric Tool Package (GMTP):** A program that aids in shape analysis with applications in pest control, taxonomy, etc. This program aids in data conversion, size calculation, shape drawing, and image cropping for outline data
  - U.S Patent registration number: TX 7-301-658
  - Link: http://tenebrionidae.net/GMTP2.php

- **Tenebrionidae website:** www.tenebrionidae.net
  - A website for all taxonomists, ecologists, and nature enthusiasts around the world who are interested in darkling beetles. Since 2005–in collaboration with Dr. Julio Ferrer (Swedish Museum of Natural History)
- **Avocado IPM website design: https://trec.ifas.ufl.edu/people/daniel-carrillo/tropical-fruit-entomology-lab/avocado-ipm/**
  - University of Florida – Tropical Research and Education Center - fruit entomology lab
  - PI: Dr. Daniel Carrillo

PROFESSIONAL AFFILIATIONS

- Entomological Society of America
  - 2010-present
- Florida Entomological Society
  - 2012-Present
- Entomological Society of Iran
  - 2003-2009

SELECTED PUBLICATIONS

- Peer-reviewed
  - **Taravati,** S. (2022a). A Needs Assessment Survey of Southern California Pest Management Professionals. The Journal of Extension, 60(2), 5.
  - Tseng, S.-P., **Taravati**, S., Choe, D.-H., Rust, M. K., & Lee, C.-Y. (2022c). Genetic Evidence for Multiple Invasions of Coptotermes formosanus (Blattodea: Rhinotermitidae) in California. Journal of Economic Entomology, 115(4), 1251–1256.
  - Tseng, S.-P., Boone, J., Boone, L., King, N., **Taravati, S.,** Choe, D.-H., & Lee, C.-Y. (2021). Genetic analysis of Formosan subterranean termite (Blattodea: Rhinotermitidae) populations in California. Journal of Economic Entomology, 114(3), 1264–1269.

- **Taravati, S.** 2018. Evaluation of low-energy microwaves technology (Termatrac) for detecting western drywood termite in a simulated drywall system. Journal of Economic Entomology. 111(3): 1323-1329
- **Taravati, S.**, C. Mannion, L. Osborne, C. McKenzie. 2016. Feeding and development of Nephaspis oculata (Coleoptera: Coccinellidae) on rugose spiraling whitefly (Hemiptera: Aleyrodidae). Florida Entomologist 99 (3), 516-521
- **Taravati, S.,** C. Mannion. 2015. Effect of aggregation and cage setting on some life history parameters of *Aleurodicus rugioperculatus* (Hemiptera: Aleyrodidae). Journal of Economic Entomology
- **Taravati, S.**, H. Glenn , C. Mannion. 2014. Daily flight activity of rugose spiraling whitefly (Hemiptera: Aleyrodidae). Florida Entomologist, 97 (14): 1842-1844
- **Taravati, S.**, O. Mirshamsi, and J. Darvish. 2009. Geometric morphometric study of two species of the psammophilous genus *Erodiontes* (Coleoptera: Tenebrionidae) from the Lute desert, Central Iran. Iranian Journal of Animal Biosystematics 5: 81-89.
- **Taravati, S.**, and J. Ferrer. 2007. A new tribe record for the darkling beetle fauna of Iran (Coleoptera: Tenebrionidae). Iranian Journal of Animal Biosystematics 3: 63-67.

- Technical/Extension articles
  - **Taravati, S.**, & Lee, C.-Y. (2021). Formosan subterranean termite alert (poster): https://urbanipmsocal.com/ipm/wp-content/uploads/2021/12/Formosan_alert_horizontal.pdf
  - **Taravati, S.** (2022b). Less known facts about the Turkestan cockroach. Pest Tactic Journal, 1(1), 1–4.
  - **Taravati, S.**, & Choe, D. H. (2023). The mysterious boric acid and its relatives. https://www.mypmp.net/2023/07/21/the-mysterious-boric-acid-and-its-relatives/.
  - **Taravati, S.**, & McDonald, C. (2023). The False Chinch Bug As A Structural Pest In Southern California. Pest Tactic Journal, 2(1), 1–8.
  - TSENG, S.-P., **TARAVATI, S.**, CHOE, D.-H., & LEE, C.-Y. (2021). Formosan Subterranean Termites Re-Discovered in Southern California. Pest Control Technology.
  - **Taravati, S.** 2017. Training public housing staff about Integrated Pest Management in Southern California. http://ucanr.edu/delivers/?impact=1010&a=0
  - **Taravati, S.** 2016. To fumigate or not to fumigate? Dealing with drywood termites and other pests in structures. http://ucanr.edu/sites/socalurbanipm/Publications/To_fumigate_or_not_to_fumigate/
  - **Taravati, S.**, C. Mannion, H. Glenn, and L. Osborne. 2013. Natural enemies of rugose spiraling whitefly, *Aleurodicus rugioperculatus* martin (insecta: hemiptera: aleyrodidae) in the South Florida landscape. UF/IFAS Extension Electronic Data Information Source, http://edis.ifas.ufl.edu/pdffiles/IN/IN100400.pdf
  - **Taravati, S.**, C. Mannion, and H. Glenn. 2013. Protecting Randell Research Center's trees from an invasive pest. Friends of Randell Research Center. 12: 2 http://www.flmnh.ufl.edu/rrc/RRC_Vol12_No3.pdf
  - **Taravati, S.**, C. Mannion, and L. S. Osborne. 2013. Management of rugose spiraling whitefly (*Aleurodicus rugioperculatus*) in the South Florida landscape. *In*, Proceedings of the Florida State Horticultural Society, 126:276–278.Sarasota, FL.
- Selected meetings organized
  - 2024-Jun-3&4: Organized the 2024 UCANR's Entomology Work Group meeting in Davis, CA.
  - 2024-Feb-21: Organized the fifth session of the Pest Insight Webinar Series. https://ucanr.edu/sites/pestinsight/workshops/Pest_Insight_Workshop_-_February_21_2024/
  - 2023-Aug-16: Organized the fourth session of the Pest Insight Webinar Series. https://ucanr.edu/sites/pestinsight/workshops/August_16_2023/
  - 2023-Jul-20: Integrated Pest Management training in Multifamily Housing for Mercy Housing – Long Beach, CA - Organized and presented.
  - 2023-Jun-5 & 6: Integrated Pest Management training in Multifamily Housing for the Housing Authority of the City of Los Angeles - Organized and presented
  - 2020-Mar-11: Organized a pesticide run-off mitigation workshop, **Santa Clarita Pyrethroid Workshop**, for priority pesticides in Bouquet Canyon near Santa Clarita, CA, funded by the Pyrethroids Working Group.

- 2017-Mar-6: Organized a pesticide run-off mitigation workshop, **Control Urban Insects and Protect Urban Water Quality**, for priority pesticides in Bouquet Canyon near Santa Clarita, CA, funded by CDPR.

- Selected presentations
  - 2024-Apr-4: Got Pests? Control Management Practices. Grow Riverside Conference.
  - 2024-Jan-24: What PMPs Want? Results from a SoCal survey. Pest Control Operators of California – San Fernando Branch meeting.
  - 2023-Dec-12: Basic Entomology: Garden Insects + Structural pests. Riverside Master Gardner Program training.
  - 2023-Dec-1: Ant control, go fast or slow?. Food Machinery & Chemical Corporation's True Champion Webinar.
  - 2023-Nov-16: What's biting me?. UC IPM Urban and Community Webinar Series.
  - 2023-Oct-24 & 25: Formosan termites & Control. Target Specialty Termite Field Day.
  - 2023-Aug-22: An introduction to Crickets. PAPA Seminars – Redlands, CA.
  - 2023-Jun-20: A Review of the Federal and California Pest Control Regulations. PAPA Seminars – Fullerton, CA.
  - 2023-May-09: All We Know About the Argentine Ant and Its Management. PAPA Seminars - Redlands, CA
  - 2023-Mar-28: Less-known facts on the biology of the Western drywood termite. UCR Urban Pest Management Conference.
  - 2022-Jan-11: Morning Wake Up with Siavash Taravati for Review of Federal and California Pest Control Regulations. Pest Control Operators of California PestEd – Montebello, CA.
  - 2022-Jun-8: A needs assessment survey of SoCal PMPs. 2022 PCOC Expo Conference. Anaheim, CA.
  - 2022-Mar-22: From real bites to false bites. UCR Urban Pest Management Conference. Riverside, CA.
  -

ATTACHMENT 7: RESEARCH OBJECTIVES

A. **Intentions, Hypotheses and Research Questions to be Tested:**

This project aims to demonstrate an areawide integrated pest management (IPM) program for crawling insect pests in residential settings by comparing pest incidence, pest density, pesticide use, cost, and customer satisfaction across three different treatment area sizes. The specific pest organisms to be targeted ae Argentine ants (*Linepithema humile*) and Turkestan cockroaches (*Periplaneta lateralis*). The treatment areas to be evaluated include 1) single-family home properties (≤ 10,000 ft2), 2) contiguous "clusters" of five single family home properties (35,000 – 50,000 ft2), and 3) institutional, industrial, or business "campuses" (≥ 50,000 ft2). Specific pest control tactics to be used may vary among participating pest control operators but will include liquid and gel formulations of insecticide baits as well as liquid or foam formulations of persistent and nonrepellent insecticides. Data to be collected include observation of presence or absence of target pest species (incidence), number of target pest individuals recovered on monitoring devices over time (density), amounts of food items removed by target pest species (proxy for density), pesticide products used, numbers of pesticide applications made, amounts of pesticide products applied, estimates of effort-hours expended by staff and technicians (proxy for service value), numbers of callbacks incurred per site (proxy for customer satisfaction), and responses to survey questions (customer satisfaction).

The working hypotheses for this research project include:

1. Incidence and density of Argentine ants and Turkestan cockroaches in the center of treatment areas will decrease as the size of the treatment areas increase.
2. Reported use of liquid insecticides belonging to the pyrethroid insecticide class will decrease as the size of treatment areas increase.
3. Reported use of pyrethroids and fipronil insecticides within our experimental treatment areas will be significantly less than that reported for conventional programs targeting Argentine ants and Turkestan cockroaches, as measured by historical comparisons and / or pest control operator focus interviews.
4. Operational costs of areawide IPM programs will be less than those of conventional general pest control programs, as measured by contract value divided by effort hours.
5. Customer satisfaction associated with areawide IPM programs will be significantly higher than that associated with conventional general pest control programs that include Argentine ants and Turkestan cockroaches, as measured by callback rates, survey responses, historical comparisons, and pest control operator focus group interviews.

Research questions to be addressed by this work include:

- Do areawide IPM programs provide better pest control of difficult general pests?
- Do areawide IPM programs lead to reductions in applications of pesticides of concern?
- Do areawide IPM programs fit into existing business models of pest control operators?
- Do areawide IPM programs lead to increased customer satisfaction?

B. **Background:**

Pest control services for general pests are very common in suburban neighborhoods and other residential settings in California. These services, which fall within the purview of Branch 2 licensees under the Structural Pest Control act, usually target crawling insects, spiders, and rodents. The most targeted crawling nuisance pest in California is the Argentine ant. Found throughout the state, especially in the urban and suburban neighborhoods of the San Francisco Bay Area, southern CA, and the Sacramento Valley, these ants are exceedingly common. Though Argentine ants typically nest outdoors in irrigated landscapes, they are known to invade structures and may even temporarily move their nests indoors, especially in response to adverse environments, such as the hot temperatures and low moisture conditions experienced during the summer and autumn months. Another crawling nuisance pest which is increasingly common in the Sacramento Valley, warmer parts of the San Francisco Bay Area, and much of southern CA, is the Turkestan cockroach. These peridomestic cockroaches live in pavement voids, in-ground utility ports, and storm drain systems. At night, they forage widely and may enter homes, garages, and outbuildings. Ants and cockroaches are not tolerated indoors by most residents, and, as such, they are major targets for general pest control services. Conventionally, these services have included regular applications of liquid-formulated residual insecticides around the exterior perimeters of homes and other structures. Such regular spray programs have been implicated by the California Department of Pesticide Regulation and other environmental monitoring parties as contributing to the ongoing observations of contamination of surface water systems, especially with pyrethroid insecticides and the insecticide active ingredients fipronil. Furthermore, these spray-reliant programs do not always provide adequate pest control of nuisance ants and cockroaches for several reasons: 1) they do not target the nests or breeding centers of these pests, 2) they do not prevent structural invasion, and 3) they may drive pest resistance (especially in cockroaches). Insecticidal baits represent alternatives to sprays and have been demonstrated as effective against nuisance ants and cockroaches in California in laboratory and field settings. Unfortunately, baits have not been widely adopted by California's structural pest control industry, perhaps because of the increased labor costs associated with bait station service and replenishment and / or the slower knockdown control provided by baits as compared to sprays. These operational problems may be especially pronounced when considering pests with widespread populations and large foraging ranges. For instance, Argentine ants, an invasive species from South America, exists in California as a genetic "supercolony" since the population experienced a genetic bottleneck during introduction. As such, individual Argentine ant colonies do not treat neighboring colonies as enemy competitors and instead function as one large colony, sharing resources and nesting sites over extremely large areas. Therefore, when ants are controlled at one property, the ants in surrounding properties quickly recolonize the treated area, posing persistent pest issues. Turkestan cockroaches are also difficult to control when focusing on a single property because the adults are known to forage 50 m or more away from harborage locations, meaning that a controlled area can quickly get reinvaded and recolonized by neighboring populations during the breeding season. These reinvasion and pest persistence issues are present even within effective baiting programs and have been mentioned as reasons pest control operators prefer regular sprays over baits.

Areawide IPM is a strategy that manages pest populations over large geographic areas rather than focusing on individual properties or populations. In theory, areawide IPM reduces pest populations across a broad region, minimizing risk or recolonization from untreated areas. This strategy requires collaboration among property owners and coordination of treatment efforts and control tactics. It is an increasingly valuable

strategy in production agriculture, where it has been sued to reduce pest damage as well as pesticide application. Such areawide programs are becoming standard practice in high-value crops such as almonds and pistachios when utilizing pheromones for mating disruption over large areas of monoculture. In urban systems, such areawide programs have been used to control public health pests such as mosquitoes and ticks. Subterranean termite populations have been controlled or even locally eradicated using areawide baiting programs. Clearly, the principles and theories associated with areawide IPM could improve bait-centric general pest programs, especially for difficult pests like Argentine ants and Turkestan cockroaches, but they have never been applied to these pests. This project aims to demonstrate that an areawide IPM strategy can be sued in California to improve general pest control, decrease applications of pesticides of concern, and increase customer satisfaction. The project will inform business models for general pest control operators in the state and will add to the growing body of areawide IPM science.

C. **Study Focus:**

This project focuses on Argentine ants and Turkestan cockroaches and will be implemented in at least three different counties in California. It represents a new study and includes alternative treatments and technologies within the framework of IPM for two of the structural pests of interest identified by the Structural Pest Control Board's research solicitation: ants and cockroaches.

ATTACHMENT 8: PROJECT DIRECTION (Work Plan & Work Schedule)

A. Research Design

Experimental treatments will include three different treatment sizes: “single property”, “cluster”, and “campus” (see above for details). Each treatment will be replicated as follows: nine to 15 single properties, three to five clusters, and three campuses. Three pest control operator companies have agreed to collaborate on this project (see attached letters), with each providing three to five single properties, at least one cluster, and one campus; these operators will provide treatments at these sites. The treatment period for these sites will be between March 1 and October 31, 2026. Operators will visit sites at least three times during this period and make treatments as needed, utilizing liquid or gel baits for ants and gel baits for cockroaches (applied within self-contained bait stations) and, if needed, spot treatments of liquid insecticides to nests, harborage locations, or structural invasion points. The UC research team will visit these sites six times during the treatment period to monitor pest populations using established methods such as pest activity observations, adhesive traps, pitfall traps, and volume displacement of sugar solutions at feeding stations. Following the conclusion of the treatment period, researchers will conduct short surveys with property owners and short interviews with pest control operators to measure satisfaction and to gather operational data. Pesticide use and service costs will be compared to historical data from the same regions and from records kept by collaborating operators.

B. Objective, Tasks, and Timelines

The overall objective of this project is to demonstrate the efficacy and the business model of areawide IPM for general crawling insect pests in residential settings.

The following table captures the proposed tasks and timelines associated with this project:

Task	Responsible Parties	Proposed Deadline
Meet with collaborating pest control operators to discuss potential sites and proposed treatment protocols	UC Research Team, participating pest control operators	January 31, 2026
Finalize treatment protocols and secure treatment materials	UC Research Team, participating pest control operators	February 28, 2026
Locate experimental sites and secure participation agreements from property owners	UC Research Team, participating pest control operators	February 28, 2026
Finalize monitoring protocols and secure all monitoring supplies	UC Research Team	February 28, 2026
Make initial visits to all sites, conduct initial monitoring activities, make initial treatments as needed	UC Research Team, participating pest control operators	March 31, 2026

Complete second monitoring visit at all sites	UC Research Team	May 30, 2026
Complete second treatment visit at all sites and third monitoring visit at all sites	UC Research Team, participating pest control operators	June 30, 2026
Complete fourth monitoring visit at all sites	UC Research Team	July 31, 2026
Complete fifth monitoring visit at all sites	UC Research Team	September 30, 2026
Complete third treatment visit at all sites and sixth monitoring visit at all sites	UC Research Team, participating pest control operators	October 31, 2026
Complete focus group interviews with pest control operators	UC Research Team	December 15, 2026
Complete satisfaction surveys with property owners	UC Research Team	December 15, 2026
Compile and share all 2026 data	UC Research Team	January 31, 2027
Provide preliminary analysis via presentation at the UC Riverside Urban Pest Management Conference	UC Research Team	March 31, 2027
Complete follow-up monitoring visits to all sites	UC Research Team	June 30, 2027
Compile and share all project data	UC Research Team	July 31, 2027
Analyze all data	UC Research Team	August 30, 2027
Publish one trade magazine article and one extension newsletter article on project findings	UC Research Team	October 31, 2027
Present project findings at NPMA PestWorld and / or ESA's annual meeting	UC Research Team	November 30, 2027
Draft and share Final Report with Pest Board	UC Research Team	December 15, 2027

C. Data Collection, Analysis, and Interpretation

Pest incidence and density data will be collected during each monitoring visit to sites, with presence or absence noted and population size estimated by number of ants observed trailing (per unit time), volume of sucrose solution removed by foraging ants (per unit time), number of cockroaches observed (per unit time), and number of cockroaches trapped on adhesive traps placed out overnight. Pesticide use and service cost will be estimated by data provided by pest control operators during focus interviews. Customer satisfaction will be measured by callback rate (as reported by collaborating operators) and responses to satisfaction surveys provided to participating property owners.

Data will be analyzed by considering treatment area as the main (fixed) factor and all other factors

(operator, region, month, specific treatment protocol) as random variables, using a mixed model approach. Pest density will be sued as the primary and continuous response variable. Effects of operator, region, and month will be considered as components of variation, and these factors may be displayed graphically to visualize trends, but treatment size will always be considered the factor of interest.

D. Time Allocation by Key Personnel

The Principal Investigator (PI: Dr. Andrew Sutherland) will devote 20% of his time to this research project. Dr. Sutherland will provide leadership and overall management of the project, supervise research staff, design experiments and data collection efforts, and oversee field-based research activities with collaborating pest control operators and property owners. Dr. Sutherland will also lead efforts to draft and develop outreach materials, publications, and presentations associated with the project. These services will be provided as "in-kind", with no funds requested.

The co-PI (Dr. Siavash Taravati) will devote 5% of his time to this project. Dr. Taravati will provide assistance and secondary guidance to the research team, helping to communicate and coordinate field-based research activities with collaborating pest control operators and property owners. These services will be provided as "in-kind", with no funds requested.

The staff research associate (SRA: to be determined…not yet hired) will devote 60% of their time to this project. The SRA will coordinate and lead all field activities. Specific duties will include the establishment of field sites, coordination and communication with collaborating pest control operators and property owners, data collection and stewardship, and direct reporting to Dr. Andrew Sutherland. Salary and benefits are requested to support 60% FTE for this staff person.

ATTACHMENT 9: Narrative of Qualifications

The principal investigator and the co-principal investigator both have demonstrated significant scientific knowledge and have published numerous peer-reviewed publications resulting from applied research projects such as that being proposed. Please refer to the curriculum vitae (Attachment 6) for specific examples. See references in Attachment 4 for pest control operators who have worked with the PI on collaborative research projects in the past.

ATTACHMENT 10: not applicable

See attached curriculum vitae for credentials and certifications of PI and co-PI.

UNIVERSITY OF CALIFORNIA
Agriculture and Natural Resources
UC Cooperative Extension, Riverside County

July 31, 2025
Dear Dr. Sutherland,

As the Urban IPM Advisor for UC Cooperative Extension in southern California, I would like to express support for your proposed project, Areawide IPM for nuisance ants and cockroaches in residential neighborhoods. Nuisance pests are commonly targeted by general pest control programs in my region, and I believe that areawide IPM approaches have the potential to improve the efficac y of pest control while reducing applications of pesticides of concern. Many pest species forage long distances and can readily cross multiple properties to reach new targets, causing nuisance problems. This has been recorded for ants, mosquitoes, and cockroaches. A common practice among PCOs is to target a single property when tackling a pest problem. However, such treatments usually have short-term effects on pest abundance and the target pests will usually return to the property, triggering customer callbacks and causing significant financial loss to the pest control company.

Pyrethroid insecticides and fipronil are commonly used as liquid residual sprays against nuisance ants and cockroaches; such treatments may contaminate urban surface waters. Both of these chemicals are subject to increasingly more rigorous regulations, and by 2050, many pyrethroids and fipronil will be completely banned in California, according to the Sustainable Pest Management roadmap published by the California Department of Pesticide Regulation (CDPR, 2023). If the pest control industry is not prepared for such a dramatic change in the pesticide market, the industry can potentially lose a considerable market share due to the fact that the efficacy of alternative chemicals and tools is not well understood.

Argentine ant (*Linepithema humilis*) is the most common urban ant species in Southern California and is found in almost every single residential and commercial property, feeding on honeydew from Hemipteran insects but also invading structures, triggering pest control remedies by the pest control industry and tenants. Their management can be very challenging due to their large colony size, multi-nest colony structure, and their long foraging distance, extending to and beyond 300 ft. Likewise, the Turkestan cockroach (*Periplaneta lateralis*) has become the most common peridomestic pest coming from the landscape. After successfully displacing the Oriental cockroach, the Turkestan cockroach has become the dominant large pest in SoCal structures adjacent to subterranean water-meter boxes and electrical boxes, as well as under concrete blocks and any other type of outdoor underground voids. Turkestan cockroaches can forage long distances, reaching areas well beyond a single property. By researching the efficacy of areawide IPM strategies as opposed to single property treatments, we can find new effective ways to combat the Argentine and Turkestan cockroach while protecting the industry and the environment.

I agree to help connect Dr. Sutherland's team to pest control operators and potential sites in my region. I am very interested in the generalized treatment protocols that will be designed, and I look forward to learning how well these will control pests. I understand that a staff research associate will be hired to regularly visit field sites in my area to collect project data. When possible, I plan to accompany this researcher to learn more about the project. When project

findings and observations are available, I plan to extend them to local pest management professionals as part of my regular extension activities. As an extension agent and researcher, I

I am heavily involved in educating the industry and performing research on safer and more effective pest control methods in Southern California. Please let me know of other ways I can help organize project activities and extend project findings.

Best regards,
Siavash Taravati (He/Him/His), Ph.D., QAL, FR Branch II

Area Integrated Pest Management Advisor
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2980 Washington St.
Riverside, CA 92504 (New)
Email: staravati@ucanr.edu
Tel: (951) 955-2599
Website: http://urbanipmsocal.com

July 29, 2025

Dear Dr. Sutherland,

As a qualified representative of Sprague Pest Solutions, I would like to express support for your proposed project *Areawide IPM for nuisance ants and cockroaches in residential neighborhoods*. Management of nuisance pests is increasingly important to property owners and represents a large component of the structural pest control industry. We believe areawide IPM approaches may provide improved pest control and should be investigated. As a regional leader in science-based pest management, Sprague is acutely aware of the limitations that arise when structural pest control is applied on a property-by-property basis—especially in the case of Argentine ants and Turkestan cockroaches, whose biology and behavior often undermine localized efforts.

We agree to help locate potential research sites for this project and to follow the generalized treatment protocols designed by your research unit at these sites for the 2026 season. The proposed areawide IPM approach aligns strongly with our commitment to long-term, sustainable pest control solutions that protect public health, property, and the environment. We look forward to the results and outcomes of this important project. Please let us know of anything else required of us at this time.

Sincerely,

Edna A Alfaro Inocente, BCE

Sprague Pest Solutions / Regional Entomologist (CO, UT, ID, NV, AZ)

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ealfaroinocente@spraguepest.com

PESTEC

3450 3rd St, 3F, San Francisco, CA 94124
Phone: 415-671-0300, Fax: 415-671-0305
www.pestec.com

July 29th, 20025

Dear Dr. Sutherland,

As a qualified representative of Pestec, I would like to express support for your proposed project *Areawide IPM for nuisance ants and cockroaches in residential neighborhoods*. Management of nuisance pests is increasingly important to property owners and represents a large component of the structural pest control industry. We believe areawide IPM approaches may provide improved pest control and should be investigated. And we are excited to support research that may contribute to novel business models that have the potential to align economic incentives with better outcomes. Economies of scales as described in the project proposal offer the greatest opportunity for sustainable pest management, by marrying business interests of practitioners with the delight of customers.

We agree to help locate potential research sites for this project and to follow the generalized treatment protocols designed by Dr. Sutherland's research unit at these sites for the 2026 season. Collaborative projects like this are our industry's greatest strength and opportunity to attract and develop the next generation of practitioners for our ever evolving field. Pestec's history of supporting collaborative projects has included development of and outreach to architects and developers on Pest Prevention By Design Guidelines; bed bug IPM demonstration and education for property managers and residents; and demonstration of IPM practices for Argentine ant control. We believe that these collaborations have yielded important learning outcomes, lasting relationships, and expanded recognition of the value of the professional structural pest management. We look forward to the results and outcomes of this important project. Please let us know of anything else required of us at this time.

Best regards,

Luis Agurto Jr.
CEO
Pestec