

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

AGREEMENT NUMBER 14-C0029
REGISTRATION NUMBER 1387590

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

STATE AGENCY'S NAME

Department of Pesticide Regulation

CONTRACTOR'S NAME

The Regents of the University of California

2. The term of this Agreement is: **November 17, 2014 or upon final approval by the State, whichever occurs later, through September 30, 2017**

3. The maximum amount of this Agreement is: **\$ 211,856.00**
Two hundred eleven thousand eight hundred fifty-six dollars and no cents

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

Exhibit A – Scope of Work	5 Pages
Exhibit B – Budget Detail and Payment Provisions	3 Pages
Exhibit C* – General Terms and Conditions (GIA 610)	
Exhibit D - Special Terms and Conditions	3 Pages
Exhibit E – Additional Terms and Conditions	1 Pages
Exhibit F – Resumes	7 Pages

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

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

CONTRACTOR

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

The Regents of the University of California

BY (Authorized Signature)

Randi Jenkins

DATE SIGNED(Do not type)

10. 22. 2014

PRINTED NAME AND TITLE OF PERSON SIGNING

Randi Jenkins, Associate Director, Sponsored Programs

ADDRESS

**1850 Research Park Drive, Suite 300
 Davis, CA 95618**

STATE OF CALIFORNIA

AGENCY NAME

Department of Pesticide Regulation

BY (Authorized Signature)

Anise Severns

DATE SIGNED(Do not type)

10/29/14

PRINTED NAME AND TITLE OF PERSON SIGNING

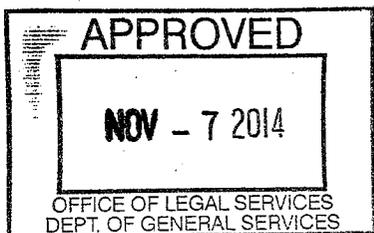
Anise Severns, Assistant Director

ADDRESS

1001 I Street, Sacramento, CA 95814

California Department of General Services Use Only

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**EXHIBIT A
STANDARD AGREEMENT**

SCOPE OF WORK

1. This Agreement is between The Regents of the University of California, hereinafter referred to as UCD or Contractor, and the Department of Pesticide Regulation, hereinafter referred to as DPR.
2. This Agreement will commence on the start date November 17, 2014 as presented herein or upon final approval by the State, whichever is later and no work shall begin before that time. This Agreement is of no effect unless approved by the State. Contractor shall not receive payment for work performed prior to approval of the Agreement and before receipt of notice to proceed by the Contract Manager. This Agreement shall expire on September 30, 2017. The services shall be provided during normal working hours.
3. The Project Representatives during the term of this Agreement will be:
 - A. All official communications, except invoices, from the Contractor to DPR, shall be directed to the attention of the DPR Contract Manager, **Dr. Yuzhou Luo**, or designee, at:

Department of Pesticide Regulation
Environmental Monitoring Branch, MS 3B
1001 I Street
P.O. Box 4015
Sacramento, CA 95812-4015

Phone (916) 445-2090 Fax (916) 324-4088
E-mail: Yuzhou.Luo@cdpr.ca.gov

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

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

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

Professor Thomas Young
Civil and Environmental Engineering
University of California, Davis
One Shields Ave.
Davis, CA 95616

Phone: (530) 754-9399 Fax: (530) 752-7872
Email: tyoung@ucdavis.edu

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D. All administrative communications, except payments, from DPR to the Contractor shall be directed to:

Office of Research, Sponsored Programs
1850 Research Park Drive, Suite 300
Davis, CA 95618

Phone: (530) 754-7700 FAX: (530) 752-0333
Email Address: awards@ucdavis.edu

E. All payments from DPR to the Contractor shall be directed to:

Cashier's Office
P.O. Box 989062
West Sacramento, CA 95798-9062

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

4. Background and Goals

To reduce the impacts of pyrethroid insecticides on surface water and bed sediments restrictions on certain types of urban applications, especially those to impervious surfaces such as driveways, were adopted. Collectively, these regulatory and product labeling changes are expected to reduce the runoff of pyrethroids into urban streams significantly; one recent study estimated that the reductions would exceed 80% based on input mass (Jorgenson et al., 2013). Because of their hydrophobicity, a large fraction of pyrethroids entering surface waters are (or will soon become) associated with particles in the water column, in many cases ultimately reaching the bed sediments. The key research questions are: (1) how quickly and to what extent will pyrethroid concentrations in bed sediments decline as inputs to the water column decline, and (2) what are the best locations and frequencies for monitoring changes in bed sediment pyrethroid concentrations.

5. Objectives

A. The working hypothesis is that pyrethroid concentrations in bed sediments are primarily determined by sediment transport processes, particularly those driven by flows generated by rain events; other factors, including dry weather flows and degradation processes, represent secondary influences. This hypothesis will be investigated by pursuing the following research objectives:

- 1) Determine the linkage between changes in pyrethroid loading to a watershed and the rate and extent of change in pyrethroid concentration in sediments using hydraulic and sediment transport models, and

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- 2) Apply this knowledge to the Department of Pesticide Regulation's Folsom and Salt Creek Long Term Monitoring sites to inform decisions regarding sampling location and frequency and the expectations regarding rate and extent of progress.

6. Work to Be Performed

A. Task 1

Develop a modeling framework for the study. The framework will specify the hydrologic and sediment transport model(s) to be used. It is expected that diverse models will be implemented to simulate the water flow and transport and fate of pyrethroids in these watersheds.

B. Task 2

Implement hydrologic models for the Folsom and Salt Creek monitoring sites. The watersheds will be delineated based on Google maps and other tools. Infiltration and evaporation parameters will be evaluated and/or calculated from reports associated with the sites, and literature sources. The initial simulations will be applied to measurements of runoff obtained during February-March 2014, and the model will be calibrated based on those observations. The model will be validated with comparisons of modeled runoff with observed values in fall 2014. Comparisons of model results with simplified models such as the SCS Runoff Curve Method will be developed. Aerial images will be used to determine water trajectories during heavy rain events in the areas, and to establish sound boundary conditions for the flow model. Flow discharges observed during the sampling campaign will be used for calibration of the flow model.

C. Task 3

Model flows derived from the simulated rain events and associated sediment transport. The model will be based on the implementation of the model CCHE-FLOOD, or with the help of CCHE-2D, from the National Center for Computational Hydroscience and Engineering, Oxford, Mississippi. The model is based on the finite volume method applied to the solution of the fully-dynamic shallow water equations in conservative form, in both one- and two-dimensional versions. CCHE-FLOOD employs a robust, shock capturing explicit scheme, able to handle diverse regimes in the domain (e.g. supercritical flows, subcritical flows, etc.). The solution scheme incorporates wetting and drying nodes. The Graphical user interface (GUI) can import GIS topographic data and results can be exported to a GIS program for post-processing.

D. Task 4

Apply the models to predict the rate and extent of bed sediment recovery at these two sites as a function of success in reducing pyrethroid loading to the watershed. Possible improvement in the location and timing of sediment sampling will be proposed based on model simulations of a range of realistic scenarios regarding regulatory effectiveness.

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7. Project Timeline

Task	2014	2015				2016				2017		
	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3
1. <i>Develop modeling framework</i>												
2. <i>Implement hydrologic models</i>												
3. <i>Model flows and sediment transport</i>												
4. <i>Apply the models to predict sediment recovery</i>												
5. <i>Prepare final report</i>												

8. Deliverables

A. Task 1

Develop a modeling framework for the study. A technical memorandum will be prepared that will indicate the model(s) to be used to describe water and sediment flows within the selected sub-basins at two monitoring sites. The memorandum will be submitted to DPR's Contract Manager via email on or before January 31, 2015.

B. Task 2

Implement hydrologic models for the selected monitoring sites. A technical memorandum will be prepared that will summarize procedures and results of the flow model calibration. The memorandum will be submitted to DPR's Contract Manager via email on or before July 31, 2015.

C. Task 3

Model flows derived from the simulated rain events and associated sediment transport. A technical memorandum will be prepared that will summarize procedures and results from the sediment transport model and any calibration possible with available data. The memorandum will be submitted to DPR's Contract Manager via email on or before July 31, 2016.

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D. Task 4

Apply the models to predict the rate and extent of bed sediment recovery at these two sites. A manuscript will be prepared for submission to a leading peer-reviewed technical journal. The manuscript will summarize the results of the flow and sediment transport model components and will predict the extent and rate of sediment quality improvements expected from the regulatory actions already taken to reduce insecticide loads to surface water from residential/urban areas. The manuscript, in the same form that it is to be submitted to the technical journal, will be emailed to DPR's Contract Manager no less than 30 days prior to submission and not later than August 31, 2017.

EXHIBIT B
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BUDGET DETAIL AND PAYMENT PROVISIONS

1. Invoicing

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

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

2. Budget Contingency Clause

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

3. Payment

- A. Costs for this Agreement shall be computed in accordance with State Administrative Manual (SAM) Sections 8752 and 8752.1.
- B. Nothing herein contained shall preclude advance payments pursuant to Article 1, Chapter 3, Part 1, Division 3, Title 2 of the California Government Code, Sections 11256 and 11257.

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

4. Rates

Rates for these services are as follows:

Table I - Details Budget

	Year 1	Year 2	Year 3	Cumulative
Salaries	\$40,011.00	\$41,211.00	\$36,998.00	\$118,220.00
Tuition Remission	\$16,541.00	\$17,368.00	\$12,157.00	\$46,066.00
Benefits[Ⓢ]	\$2,595.00	\$2,818.00	\$2,982.00	\$8,395.00
Supplies and Materials	\$2,000.00	\$2,000.00	\$2,017.00	\$6,017.00
Direct Costs	\$61,147.00	\$63,397.00	\$54,154.00	\$178,698.00
Indirect Costs[Ⓢ]	\$11,152.00	\$11,507.00	\$10,499.00	\$33,158.00
Total Costs	\$72,298.00	\$74,905.00	\$64,653.00	\$211,856.00

[Ⓢ]Benefits include: Worker's Compensation and other benefits appropriate for title
(NOTE: Student Interns are non-personnel employees with no benefits and shall be excluded from the percentage calculation of this line item.)

[Ⓢ]Indirect Costs calculated at 25% of Modified Total Costs (Total Costs – Tuition Remission)

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Table II - Details Personnel

SALARIES	FY 14-15	FY 15-16	FY 16-17
Thomas Young, PI (\$17,085/mo. X 1 mo./yr. @ 50%)	\$8,543.00	\$8,799.00	\$9,063.00
Fabian Bombardelli, Co-PI (\$11,144/mo. X 1 mo./yr. @ 50%)	\$5,572.00	\$5,739.00	\$5,912.00
Graduate Student Researcher Level 3 (\$3,495/mo. 49% academic year and 100% during summer months) Year 3 for 2 qtrs.	\$25,896.00	\$26,673.00	\$22,023.00
In-state student fee compensation for GSR III *included a 5% increase each year.	\$16,541.00	\$17,368.00	\$12,157.00
Salary Total	\$56,552.00	\$58,579.00	\$49,155.00
BENEFITS			
Composite Benefits Rates were used for PI & Co-PI (16% FY14-15, 17% FY15- 16, & 18% FY16-17)	\$2,259.00	\$2,472.00	\$2,695.00
GSR III @ 1.3%	\$336.00	\$346.00	\$287.00
Benefits total	\$2,595.00	\$2,818.00	\$2,982.00

5. Cost Limitation

- A. The total amount of this Agreement shall not exceed \$211,856.00
- B. It is understood and agreed that this total is an estimate and that DPR will pay for only those services actually rendered as authorized by the DPR Contract Manager or his/her designee.

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SPECIAL TERMS AND CONDITIONS

1. Termination

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

2. Subcontracting

- A. Contractor shall perform the work contemplated with resources available within its own organization and no portion of the work shall be subcontracted unless the subcontract(s) is identified in this Agreement.
- B. Any substitution of subcontractors must be approved in writing by the DPR Contract Manager in advance of assigning work to a substitute subcontractor.

3. State-Owned Data - Integrity and Security

- A. Contractor shall comply with the following requirements to ensure the preservation, security, and integrity of State-owned data on portable computing devices and portable electronic storage media:
 - 1) Encrypt all State-owned data stored on portable computing devices and portable electronic storage media using government-certified Advanced Encryption Standard (AES) cipher algorithm with a 256-bit or 128-bit encryption key to protect DPR data stored on every sector of a hard drive, including temp files, cached data, hibernation files, and even unused disk space.
 - 2) Data encryption shall use cryptographic technology that has been tested and approved against exacting standards, such as FIPS 140-2 Security Requirements for Cryptographic Modules.
 - 3) Encrypt, as described above, all State-owned data transmitted from one computing device or storage medium to another.
 - 4) Maintain confidentiality of all State-owned data by limiting data sharing to those individuals contracted to provide services on behalf of the State, and limit use of State information assets for State purposes only.

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- 5) Install and maintain current anti-virus software, security patches, and upgrades on all computing devices used during the course of the Agreement.
- 6) Notify the Contract Manager immediately of any actual or attempted violations of security of State-owned data, including lost or stolen computing devices, files, or portable electronic storage media containing State-owned data.
- 7) Advise the owner of the State-owned data, the agency Information Security Officer, and the agency Chief Information Officer of vulnerabilities that may present a threat to the security of State-owned data and of specific means of protecting that State-owned data.

B. Contractor shall use the State-owned data only for State purposes under this Agreement.

C. Contractor shall not transfer State-owned data to any computing system, mobile device, or desktop computer without first establishing the specifications for information integrity and security as established for the original data file(s).

5. Dispute Resolution

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

6. 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

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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.

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ADDITIONAL PROVISIONS

1. Disposition of Work Product

- A. DPR retains use and non-commercial governmental distribution rights to all deliverables identified in Exhibit A of this Agreement.
- B. Contractor must include the following disclosure statement on any publically available materials including but not limited to documents, publications, reports, brochures, websites, or electronic media funded in whole or part by this contract/grant: "The Department of Pesticide Regulation (DPR) provided partial or full funding for this project but does not necessarily agree with any opinion expressed, nor endorse any commercial product or trade name mentioned.
- C. DPR may not fund any project or portion of a project deemed to promote or disparage any brand or trade name, or contradict the Department's regulatory program. Therefore, DPR must approve all deliverables before final release.

2. Contractor Evaluation

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

3. Consulting Services

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

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Thomas M. Young

Department of Civil & Environmental Engineering
University of California
Davis, CA 95616

Education

University of Michigan, Ph.D., Environmental Engineering, 1996
University of California, Berkeley, M.P.P., Graduate School of Public Policy, 1987
Michigan State University, B.S. with Honors, Chemical Engineering, 1985

Professional Experience

University of California, Davis, Professor (7/06-present)
University of California, Davis, Associate Professor (7/01-6/06)
University of California, Davis, Assistant Professor (11/95-6/01)
University of Michigan, Research and Teaching Assistant (9/91-9/95)
US Environmental Protection Agency, Environmental Protection Specialist (8/87-8/90)

Peer-Reviewed Journal Publications (Selected as relevant to this proposal from 78 total)

- Luo, Y., Jorgenson, B.; Thuyet, D.; Young, T.M., Spurlock, F., Goh, K. "Insecticide washoff from concrete surfaces: characterization and prediction," *Environmental Science and Technology*, **2014**, 48(1): 234–243.
- Parry, E. and Young, T.M. "Distribution of pyrethroid insecticides in secondary wastewater effluent," *Environmental Toxicology and Chemistry*, **2013**, 32(12), 2686-2694.
- Jorgenson, B.C., Brown, L., Fleishman, E., Macneale, K., Schlenk, D., Scholz, N., Spromberg, J., Werner, I., Weston, D., Young, T.M., Zhang, M., Zhao, Q. "Predicted Transport of Pyrethroid Insecticides From An Urban Landscape To Surface Water," *Environmental Toxicology and Chemistry*, **2013**, 32 (11): 2469-77.
- Luo, Y., Spurlock, F., Jiang, W., Jorgenson, B.C., Young, T.M., Gan, J., Gill, S., Goh, K.S. "Pesticide washoff from concrete surfaces: literature review and a new modeling approach," *Water Research*, **2013**, 47: 3163-3172.
- Jorgenson, B.C., Wissel-Tyson, C., Young, T.M. "Factors Contributing to the Off-Target Transport of Pyrethroid Insecticides from Urban Surfaces," *Journal of Agricultural and Food Chemistry*, **2012**, 60(30): 7333-7340.

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- Thuyet, D.Q., Jorgenson, B.C., Wissel-Tyson, C., Watanabe, H., Young, T.M. "Wash off of imidacloprid and fipronil from turf and concrete surfaces using simulated rainfall" *Science of the Total Environment*, **2012**, 414: 515-524.
- Giudice, B.D., Young, T.M. "Mobilization of endocrine disrupting chemicals, heavy metals, and estrogenic activity in simulated rainfall runoff from land-applied biosolids" *Environmental Toxicology and Chemistry*, **2011**, 30(10): 2220-2228.
- Fojut, T.L., Young, T.M. "Desorption of pyrethroids from suspended solids" *Environmental Toxicology and Chemistry*, **2011**, 30(8): 1760-1766.
- Fojut, T.L., Young, T.M. "Pyrethroid sorption to Sacramento River suspended solids and bed sediments" *Environmental Toxicology and Chemistry*, **2011**, 30(4): 787-792.
- Jorgenson, B.C., Young, T.M. "Formulation effects and the off-target transport of pyrethroid insecticides from urban hard surfaces" *Environmental Science & Technology*, **2010**, 44(13), 4951-7.
- Giudice, B., Young, T.M. "The Antimicrobial triclocarban stimulates embryo production in the freshwater mudsnail *Potamopyrgus Antipodarum*" *Environmental Toxicology and Chemistry*, **2010**, 29(4): 966-970.
- Hwang, H.-M., Green, P.G., Young, T.M. "Historical trends of trace metals in a sediment core from a contaminated tidal salt marsh in San Francisco Bay" *Environmental Geochemistry and Health*, **2009**, 31:421-430.
- Hwang, H.M., Green, P.G., Young, T.M. "Tidal salt marsh sediment in California, USA: Part 3. Current and historic toxicity potential of contaminants and their bioaccumulation" *Chemosphere*, **2008**, 71: 2139-2149.
- Hwang, H.-M., Green, P.G., Higashi, R.M., Young, T.M. "Tidal salt marsh sediment in California, USA: Part 2. Occurrence and anthropogenic input of trace metals," *Chemosphere*, **2006**, 64: 1899-1909.
- Hwang, H.-M., Green, P.G., Young, T.M. "Tidal salt marsh sediment in California, USA: 1. Occurrence and sources of organic contaminants," *Chemosphere*, **2006**, 64: 1383-1392.
- Huang, X., Massoudieh, A., Young, T.M. "Measured and Predicted Herbicide Removal by Mulch" *Journal of Environmental Engineering*, **2006**, 132(8): 918-925.
- Huang, X., Fong, S., Deanovic, L., Young, T.M. "Toxicity of Herbicides in Highway Runoff" *Environmental Toxicology and Chemistry*, **2005**, 24, 214-218.

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- Massoudieh, A., Huang, X., Young, T.M., Mariño, M.A. "Modeling Fate and Transport of Roadside-Applied Herbicides" *Journal of Environmental Engineering*, **2005**, 131, 1057-1067.
- Lu, X.Q., Werner, I., Young, T.M. "Geochemistry and Bioavailability of Metals in Sediments from Northern San Francisco Bay" *Environment International*, **2005**, 31, 593-602.
- Huang, X., Pedersen, T., Fischer, M., White, R., Young, T. M. "Herbicide Runoff Along Highways: II. Sorption Control" *Environmental Science & Technology*, **2004**, 38, 3272-3278.
- Huang, X., Pedersen, T., Fischer, M., White, R., Young, T. M. "Herbicide Runoff Along Highways: I. Field Observations" *Environmental Science & Technology*, **2004**, 38, 3263-3271.
- Datta, S., Do, L.V., Young, T.M. "A Simplified Method for Sampling and Analysis of High Volume Surface Water for Organic Contaminants Using XAD-2" *Journal of Environmental Science and Health Part B*, **2004**, B39(2): 225-234.
- Biomarker responses in *Macoma Nasuta* exposed to sediments from northern San Francisco Bay" *Marine Environmental Research*, **2004**, 58: 299-304.

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Fabían A. Bombardelli, Associate Professor

Department of Civil and Environmental Engineering, University of California, Davis
2001 Ghausi Hall (former Engineering Unit III), One Shields Ave., Davis, CA 95616
Fax: (530) 752-7872; Phone: (530) 752-0949

E-mail: fabianbombardelli2@gmail.com; bmbrdfl@yahoo.com; fabombardelli@ucdavis.edu

Website: <http://cee.engr.ucdavis.edu/faculty/bombardelli/default.htm>

a. Professional preparation

National University of La Plata, Argentina	Hydraulic Engineering	Diploma, 1992
Thesis of Scholarship, INA, Argentina	Equivalent to a MS degree	1993
University of Buenos Aires, Argentina	Numerical Simulation & Control	Magister, 1999
University of Illinois, Urbana-Champaign	Civil & Env. Engineering	Ph.D., 2004

b. Appointments

Associate Professor, Civil & Env. Eng., University of California, Davis, July 2011 - present
Assistant Professor, Civil & Env. Eng., University of California, Davis, January 2004 - July 2011.
Research Assistant, University of Illinois, Urbana-Champaign, August 1998 - December 2003.
Researcher in Hydraulic models, National Institute for Water, Argentina, October 1991 - July 1998.
Undergraduate Research Assistant, Bureau of Public Roads of Buenos Aires Province, Argentina, March 1989 - September 1991.

c. Significant publications

Journal publications in the last five years:

1. Bombardelli, F. A., and Jha, S. K. (2009). "Hierarchical modeling of the dilute transport of suspended sediment in open channels." *Environmental Fluid Mechanics*, 9, 207-235.
2. Bombardelli, F. A., Cantero, M. I., Garcia, M. H., and Buscaglia, G. C. (2009). "Numerical aspects of the simulation of discontinuous saline underflows: the lock exchange problem." *J. Hyd. Res., IAHR*, 47(6), 777-789.
3. Chung, E. G., Bombardelli, F. A., and Schladow, G. (2009a). "Sediment resuspension in a shallow lake." *Water Resources Research*, 45, W05422.
4. Chung, E. G., Bombardelli, F. A., and Schladow, G. (2009b). "Modeling linkages between sediment resuspension and water quality in a shallow, eutrophic, wind-exposed lake." *Ecological Modeling*, 220(9-10), 1251-1265.
5. Jha, S. K., and Bombardelli, F. A. (2009). "Two-phase modeling of turbulence in dilute sediment-laden, open-channel flows." *Environmental Fluid Mechanics*, 9, 237-266.
6. Behrens, D. K., Bombardelli, F. A., Largier, J. L., and Twohy, E. (2009). "Characterization of time and spatial scales of a migrating rivermouth." *Geophys. Res. Lett.*
7. Bombardelli, F. A., and Chanson, H. (2009). "Progress in the observation and modeling of turbulent multi-phase flows." *Environmental Fluid Mechanics*, 9(2), 121-123.
8. Massoudieh, A., Bombardelli, F. A., and Ginn, T. R. (2010). "A biogeochemical model of contaminant fate and transport in river water and sediments." *J. Contaminant Hydrology*, 112, 103-117.
9. Jha, S. K., and Bombardelli, F. A. (2010). "Toward two-phase flow modeling of non-dilute sediment transport in open channels." *J. Geophys. Res., Earth Surface*, 115, F03015.

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10. Jha, S. K., and Bombardelli, F. A. (2011). "Theoretical/numerical model for the transport of non-uniform suspended sediment in open channels." *Advances in Water Resources*, 34(5), 577-591.
11. Bombardelli, F. A., Meireles, I., and Matos, J. (2011). "Laboratory measurements and multi-block numerical simulations of the mean flow and turbulence in the non-aerated skimming flow region of steep stepped spillways." *Environmental Fluid Mechanics*, 11(3), 263-288.
12. Moreno, P. A., and Bombardelli, F. A. (2012). "3D numerical simulation of particle-particle collisions in saltation mode near stream beds." *Acta Geophysica*, 60(6), 1661-1688.
13. Meireles, I., Renna, F., Matos, J., and Bombardelli, F. A. (2012). "Skimming non-aerated flow on stepped spillways over roller compacted concrete dams." *J. Hyd. Engrg., ASCE*, 138(10), 870-877.
14. Behrens, D. K., Bombardelli, F. A., Largier, J. L., and Twohy, E. (2013). "Episodic closure of the tidal inlet at the mouth of the Russian River - A small bar-built estuary in California." *Geomorphology*, 189, 66-80.
15. Fleenor, W. E., and Bombardelli, F. A. (2013). "Simplified 1-D hydrodynamic and salinity transport modeling of the Sacramento-San Joaquin Delta: Sea level rise and water diversion effects." *San Francisco Estuary and Watershed Science Journal*, 11(4), December.
16. Meireles, I., Bombardelli, F. A., and Matos, J. (2014). "Air entrainment onset in skimming flows on steep stepped spillways: an analysis." *J. Hyd. Res., IAHR*, in press.
17. Zamani, K., and Bombardelli, F. A. (2014). "Analytical solutions of nonlinear and variable-parameter transport equations for verification of numerical solvers." *Environmental Fluid Mechanics*, Online first, December 2013.
18. Fazel, K., Scharffenberg, W. A., and Bombardelli, F. A. (2014). "Assessment of the melt rate function in a temperature index snow model using observed data." *J. Hydrologic Eng., ASCE*, Online first, October 2013.

Book chapters in the last five years:

19. Massoudieh, A., Zagar, D., Green, P. G., Cabrera-Toledo, C., Horvat, M., Ginn, T. R., Barkouti, T., Weathers, T., and Bombardelli, F. A. (2009). "Modeling mercury fate and transport in aquatic systems." Chapter 13 in: *Advances in Environmental Fluid Mechanics*, D. Mihalovich, and Carlo Gualtieri (Eds.), World Scientific, 275-308.
20. Bombardelli, F. A. (2012). "Water distribution systems." Chapter 1, Vol. 2, in *Environmental Fluid Mechanics*, H. J. Fernando (Ed.).
21. Bombardelli, F. A., and Moreno, P. A. (2012). "Exchanges at the bed sediments-water column interface." Chapter 8 in: *Fluid Mechanics of Environmental Interfaces*, Second Edition, C. Gualtieri, and D. T. Mihalovic (Eds.), 221-253.
22. Jha, S. K., and Bombardelli, F. A. (2014). "Modeling sediment transport in open channels using two-phase flow theory." in press.

d. Synergistic activities

Selected *Editor in Chief* of the Inter American Journal of Water, to be published by Elsevier, starting in 2014.

Associate Editor, International Journal of Sediment Research, January 2014 – present.

Associate Editor, Journal of Hydraulic Engineering, ASCE, February 2013 – present.

Member of the Editorial Board of Environmental Fluid Mechanics, 2011 – present.

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Member of the Editorial Board of the Open Civil Engineering Journal, 2007 – present.

Guest Editor of Special Issue of Environmental Fluid Mechanics, 2007-2009.

Plenary Speaker at: a) Int. Symposium on Hydraulic Structures, Porto, Portugal 2012; b) Latin American Congress on Hydraulics, San Jose, Costa Rica, 2012; c) Jornadas de Calidad de Agua, Buenos Aires, Argentina, November, 2012; d) MEH III, Symposium on Experimental Methods in Hydraulics, Santa Fe, Argentina, March, 2013; e) Jornadas de Ingenieria del Agua, Valencia, Spain, Octubre, 2013.

Session Keynote Speaker at: a) ENIEF (Congress on Numerical Methods and their Applications) 2004, Bariloche, Argentina; b) ASME Conference on Applied Mechanics, Austin, Texas, 2007; c) and other three invitations in China, Brazil and Argentina which I could not attend due to personal reasons.

Member of Scientific Committee of: a) Second Int. Symposium on Shallow Flows, Hong Kong, 2008; b) Second, and Fourth Int. Junior Researcher and Engineer Workshops on Hydraulic Structures, Pisa, Italy, 2008, and Logan, Utah, 2012; Workshop on Hydraulic Structures, c) Fourth Int. Symposium of Hydraulic Structures, Porto, Portugal 2012; d) Int. Int. Workshop on Hydraulic Design of Low-Head Structures, Aachen, Germany, 2013; e) River Flow 2008, Cezme, Turkey, River Flow 2010, Bruchswieg, Germany, River Flow 2012, San Jose, Costa Rica; f) ENIEF (Congress on Numerical Methods and their Applications) 2004, Bariloche, Argentina; g) MECOM (Congress on Numerical Methods and their Applications) 2005, Buenos Aires, Argentina; h) RCEM (River, Coastal and Estuarine Morphodynamics) 2009, Santa Fe, Argentina, 2011, Beijing, China, 2013, Santander, Spain, and 2015, Peru.

Invited Chairperson of Sessions at: a) S24, XXXI IAHR Congress, Seoul, Korea, 2005; b) River Flow, 2008, Cezme, Turkey; c) Latin American Congress on Hydraulics, San Jose, Costa Rica, 2012; d) River Flow, 2012, San Jose, Costa Rica.

Reviewer of J. of Hydraulic Research, ASCE J. of Hydraulic Engineering, J. of Computational Physics, Env. Fluid Mech., J. Fluid Mech, Phys. Fluids, Geophys. Res. Lett., Scientia Iranica, Natural Hazards, Water Resources Res., Water Research, ASCE J. Env. Eng., J. Geophys. Res., Advances in Water Resources, J. of the Water Environment Federation, ASCE J. of Hydrologic Engineering, Hydroinformatics, Int. J. of Sediment Research, American Society of Agricultural and Biological Engineers, Int. J. Multiphase Flow, Nuclear Eng. and Design, ASME J. of Fluids Eng., Expts. in Fluids, J. of Hydro-Environment and Res.

Rapporteur and Member of the Scientific Committee of 7th Int. Conf. on Lake Management and Conservation, October 1997, San Martín de los Andes, Argentina.

e. Collaborators and other affiliations

(i) Dissertation Advisors

Angel N. Menendez, National Institute of Water (INA), Argentina (M.S. advisor).

Marcelo H. Garcia, University of Illinois at Urbana-Champaign (Ph.D. advisor).

Gustavo C. Buscaglia, High Performance Computing Laboratory, Universidade de Sao Paulo, Brazil; formerly, Balseiro Institute, Argentina (Ph.D. co-advisor).

(ii) Advised Students

Andrea E. González (Ph.D., UCD, 2008), Sanjeev Jha (Ph.D., UCD, 2009), Arash Massoudieh (Ph.D., UCD, 2006), Eu Gene Chung (Ph.D., UCD, 2007), Ines Meireles (Ph.D., University of Aveiro, 2011), Dane K. Behrens (Ph.D., UCD, 2012), Anthony McDonald (M.S., UCD, 2007), Dane K. Behrens (M.S., UCD, 2008), James Kohne (M.S., UCD, 2010), Joseph Waltz (M.S.,

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UCD, 2007), Khalida Fazel (M.S., UCD, 2011), Swetcha Reddy (M.S., UCD, 2011), Shreya Hedge (M.S., UCD, 2012), Juan Pablo Toro (M.S., UCD, 2013).

f. Awards and recognitions in the last three years

Selected Editor in Chief of the Inter American Journal of Water, to be published by Elsevier, starting in 2014.

Received amount of \$2,600 from the UC Davis Ray Krone Professorship for the year 2012-2013 by Prof. Jay Lund.

J. of Hydraulic Eng., ASCE, Outstanding Reviewer Award, 2011.

J. of Hydraulic Res., IAHR, "Willi Hager" Award for Best Reviewer Award for the period 2009-2010, International Association for Hydro-Environment Engineering and Research (IAHR). (Received at the 34th IAHR Congress in Brisbane, Australia, July 1, 2011.)

g. Funding in the last three years

Sponsor: Federal Emergency Management Agency (FEMA), "Development of 2-D flow model recommendations for floodplain mapping," as PI (Dr. William Fleenor as Co-PI). Total budget: \$84,457. Period: May 2013 – December 2013. Finished.

Sponsor: National Science Foundation (NSF), "Scour monitoring and failure prediction for safe and resilient transportation infrastructures," as Co-PI (Prof. Kenneth Loh as PI). Total budget: \$338,600. Period: October, 2012 – September, 2015.

Sponsor: Philip Williams and Associates and Sonoma County, "Modeling sea water intrusion and trapping at the Russian River, California," as PI (Prof. John Largier as Co-PI). Total budget: \$173,796. Period: January, 2011 – March, 2014 (extended).

Sponsor: California Water Resources Control Board, "Assessment of different approaches for the computation of residence times in the Sacramento-San Joaquin Delta," as PI (Dr. William Fleenor as Co-PI). Total budget: \$76,413. Period: June, 2010 - May, 2011. Finished.

Sponsor: California Water Resources Control Board, "Comparison of flow and transport models for the Sacramento-San Joaquin Delta," as PI. Total budget: \$58,580. Period: January, 2009 - October, 2012 (extended).

