Danika L. LeDuc

Department of Chemistry and Biochemistry
California State University, East Bay
Hayward, CA 94542
(510) 885-3463
danika.leduc@csueastbay.edu

Education

Ph.D. Chemistry 2000
University of California, Berkeley, Berkeley, CA
"Structural and Functional Characterization of a Minimal Membrane Fusion Machinery of Influenza Hemagglutinin"
Advisor: Professor Yeon-Kyun Shin

B.S. Chemistry 1996
Massachusetts Institute of Technology, Cambridge, MA
1996 Merck Index Award for Academic Excellence in Chemistry
1996 National Science Foundation Graduate Fellowship – Honorable Mention

Experience

2006 – present Assistant Professor
Department of Chemistry and Biochemistry, California State University, East Bay, Hayward, CA

2005 – 2006 Lecturer
Department of Chemistry and Biochemistry, California State University, East Bay, Hayward, CA

2004 Lecturer
Department of Chemistry, Santa Clara University, Santa Clara, CA

2001- 2006 Associate Specialist/Postdoctoral Researcher/Lab Manager
Department of Plant and Microbial Biology, University of California, Berkeley

1996-2000 Graduate Research Assistant/Graduate Student Instructor
Department of Chemistry, University of California, Berkeley

Publications (in Chronological Order)

1. LeDuc, D.L. and Y.K. Shin. 2000. Insights into a structure-based mechanism of viral membrane fusion. *Bioscience Reports* 20:557-70.
2. LeDuc, D.L., Y.K. Shin, R.F. Epand, R.M. Epand. 2000. Factors determining vesicular lipid mixing induced by shortened constructs of influenza hemagglutinin. *Biochemistry* 39:2733-9.
3. Epand, R.F., C.M. Yip, L.V. Chernomordik, D.L. LeDuc, Y.K. Shin, R.M. Epand. 2001. Self-assembly of influenza hemagglutinin: studies of ectodomain aggregation by in situ atomic force microscopy. *Biochimica Biophysica Acta* 1513:167-75.
4. Leikina, E., D.L. LeDuc, J.C. Macosko, R. Epand, R. Epand, Y.K. Shin, Chernomordik, L.V. 2001. The 1-127 HA2 construct of influenza virus hemagglutinin induces cell-cell hemifusion. *Biochemistry* 40:8378-86.
5. Berken, A., M.M. Mulholland, D.L. LeDuc, and N. Terry. 2002. Genetic engineering of plants to enhance selenium phytoremediation. *Critical Reviews in Plant Science.* 21:567-582.
6. Fox, P.M., D.L. LeDuc, H. Hussein, Z.-Q. Lin, and N. Terry. 2002. Selenium speciation in soils and plants. In: *Biogeochemistry of Environmentally Important Trace Elements. ACS Symposium Series.* Eds. Y. Cai and O. Braids. pp. 339-354.

7. Meija, J., M. Montes-Bayon, D.L. LeDuc, N. Terry, and J.A. Caruso. 2002. Simultaneous monitoring of volatile selenium and sulfur species from Se accumulating plants (wild-type and genetically modified) by GC-MS and GC-ICP-MS using SPME for sample introduction. *Analytical Chemistry*. 74:5837-5844.
8. LeDuc, D.L. and N. Terry. 2003. Physiological and environmental significance of selenium. In *Sulfur Transport and Assimilation in Plants. Regulation, Interaction, and Signaling.* Eds. J.-C. Davidian, D. Grill, L.J. De Kok, I. Stulen, M. J. Hawkesford, E. Schnug, and H. Rennenberg. pp. 79-89. Backhuys Publishers, Leiden, The Netherlands.
9. Montes-Bayon, M., D.L. LeDuc, N. Terry, J.A. Caruso. 2002. Selenium speciation in wild-type and genetically modified Se accumulating plants with HPLC separation and ICP-MS/ES-MS detection. *Journal of Analytical Atomic Spectrometry* 17:872-879.
10. Montes-Bayón, M., Meija, J., LeDuc, D. L., Terry, N., Caruso, J.A., and Sanz-Medel, A. 2003. HPLC-ICP-MS and ES-Q-TOF analysis of biomolecules induced in *Brassica juncea* during arsenic accumulation. *Journal of Analytical Atomic Spectrometry* 19:153-158.
11. Terry, N., Sambukumar, S.V., and LeDuc, D.L**.** 2003. Biotechnological approaches for enhancing phytoremediation. *Acta Biotechnologica* 2-3:281-288.
12. van Huysen, T., Abdel-Ghany, S., Hale, K.L., LeDuc, D., Terry, N., and Pilon-Smits, E.A.H. 2003. Overexpression of cystathionine γ-synthase enhances selenium volatilization in *Brassica juncea*. *Planta* 218:71-78.
13. Grant, T.D., Montes-Bayón, M., LeDuc, D., Fricke, M.W., Terry, N., and Caruso, J.A. 2004. Identification and characterization of Se-methyl selenomethionine in *Brassica juncea* roots. *Journal of Chromatography A* 1026:159-166.
14. LeDuc, D.L., Tarun, A.S., Montes-Bayón, M., Meija, J., AbdelSamie, M., Wu, C.P., Malit, M.F., Chang, C.-Y., Tagmount, A., de Souza, M., Neuhierl, B., Böck, A., Caruso, J., and Terry, N. 2004. Overexpression of selenocysteine methyltransferase in *Arabidopsis thaliana* and *Brassica juncea* increases selenium tolerance and accumulation. *Plant Physiology*. 135:377-383.
15. Bañuelos, G., Terry, N., LeDuc, D., Pilon-Smits, E.A.H., and Mackey, B. 2005. Field trial of transgenic Indian mustard plants shows enhanced phytoremediation of selenium-contaminated soil. *Environmental Science & Technology*. 39:1771-1777.
16. LeDuc, D.L**.** and Terry, N. 2005. Phytoremediation of Toxic Trace Elements in Soil and Water. Journal of Industrial Microbiology and Biotechnology. 32:514-520.
17. LeDuc, D.L. and Terry, N. 2005. Genetic engineering stress tolerant plants for phytoremediation. In: *Abiotic Stress Tolerence in Plants*. Eds. A.K. Rai and T. Takabe. Springer, Dordrecht, The Netherlands.
18. LeDuc, D.L**.**, AbdelSamie, M., Móntes-Bayon, M., Wu, C.P., Reisinger, S.J., and Terry, N. 2006. Overexpressing both ATP sulfurylase and selenocysteine methyltransferase enhances selenium phytoremediation traits in Indian mustard. *Environmental Pollution* 144:70-76.
19. Navaza, A.P., Montes-Bayon, M., LeDuc, D.L**.**, Terry, N., and Sanz-Medel, A. 2006. Study of phytochelatins and other related thiols as complexing biomolecules of As and Cd in wild type and genetically modified *Brassica juncea* plants. *Journal of Mass Spectrometry* 41:323-331.
20. Bañuelos, G., LeDuc, D**.,** Pilon-Smits, E.A.H., and Terry, N. 2007. Transgenic Indian mustard overexpressing selenocysteine lyase or selenocyteine methyltransferase exhibit enhanced potential for selenium phytoremediation under field conditions. *Environmental Science & Technology* 41(2):599-605.
21. Kubachka, K.M., Meija, J., LeDuc, D. L., Terry, N., and Caruso, J.A. 2007. Selenium volatiles as proxy to the metabolic pathways of selenium in genetically modified *Brassica juncea*. *Environmental Science & Technology* 41(6):1863-1869.

22. Pilon-Smits, E.A.H. and LeDuc, D.L. 2009. Phytoremediation of selenium using transgenic plants. *Current Opinions in Biotechnology* 20:207-212.
23. Verbruggen, N. and LeDuc, D.L. 2009. Potential of plant genetic engineering for phytoremediation of toxic trace elements. In: Encyclopedia of Life Support Systems, Ed. Tomas Vanek, Developed under the Auspices of the UNESCO, Eolss Publishers, Oxford, UK [http://www.eolss.net].
24. Bañuelos, G.S., LeDuc D., and Johnson, J. 2010. Evaluating the tolerance of young hybrid poplar trees to recycled waters high in salinity and boron. *Int. J. Phytoremediation* 5:419 –429.
25. Carrasco-Gil, S., Alvarez-Fernandez, A., Sobrino-Plata, J., Millan, R., Carpena-Ruiz, R., LeDuc, D., Andrews, J., Abadia, J., Hernandez, L. E. 2011. Complexation of Hg with phytochelatins is important for plant Hg tolerance. *Plant, Cell and Environment.* DOI: 10.1111/j.1365-3040.2011.02281.x

Granted Proposals

1. LeDuc, D.L. "Using Differential Gene Expression to Understand Selenium Hyperaccumulation in *Astragalus bisulcatus*" CSUEB-Faculty Support Grant
   Award: $9,000 Duration: 1/1/07 – 8/31/07
2. LeDuc, D.L., Santamaria, J., Fakra, S., Marcus, M.A. "Micro-EXAFS to Locate Toxic Trace Elements in the Metal Hyperaccumulator, *Salvinia minima* L. Baker" Advanced Light Source, Lawrence Berkeley National Laboratory
   Award: 12 8-hour shifts of beamtime Duration: 1/1/2007 – 12/31/2007
3. LeDuc, D.L. "Using Differential Protein Expression to Understand Selenium Hyperaccumulation in *Astragalus bisulcatus*" CSUEB-Faculty Support Grant
   Award: $9,000 Duration: 7/1/08 – 6/31/09
4. LeDuc, D.L. "Metal Localization and Speciation in Two Metal-Hyperaccumulating Plants" Stanford Synchrotron Radiation Laboratory
   Award: 3 8-hour shifts of beamtime Duration: 1/1/2009 – 3/31/2009
5. LeDuc, D.L. "Elucidating the Molecular Mechanism of Selenium Hyperaccumulation in *Stanleya pinnata"* CSUPERB Faculty Seed Grant
   Award: $15,000 Duration: 2/1/2009 – 5/31/2010
6. LeDuc, D.L. & Acik, L. "Elucidating the mechanism of nickel and cobalt hyperaccumulation in Alyssum species" Sieber Interdisciplinary Research Award, CSUEB, COS
   Award: $8,000 Duration: 9/21/2009 – 9/20/2010
7. Amos, W.M., LeDuc, D.L., & Hayter, J. "Localization and speciation of selenium in hyperaccumulator *Stanleya pinnata*" Stanford Synchrotron Radiation Lightsource
   Award: beamtime, rating 1.5/4 (1 highest) Duration: 11/1/2009 – 10/31/2011
8. Prince, J., Bañuelos, G.S., & LeDuc, D.L. "Selecting poplar clones for irrigation with poor quality water – combining field studies with molecular approaches." CSU-ARI
   Award:$13,084 Duration: 1/22/10 – 1/22/11
9. LeDuc, D.L. "Foundations in Science: A Model for the Preparatioin and Professional Development of Elementary and Middle School Teachers in California to Strengthen Science Instruction and Application of STEM Principles." S.D. Bechtel, Jr. Foundation/Broadcom Foundation
   Award: $450,000 Duration: 7/22/10 – 7/22/12

Research Seminars

1. "Revealing the Molecular Basis for Metal Hyperaccumulation in Plants" California State University, Chico, February 9, 2007.

2. "Understanding Toxic Trace Element Metabolism in Plants" San Jose State University, September 14, 2010.

Student Poster Presentations

1. Cassano, J.A., Terry, N., and LeDuc, D.L. Differentially expressed genes in the selenium hyperaccumulating plant *Astragalus bisulcatus* and its non-accumulating relative *Astragalus cicer*. CSUPERB Symposium, January 11-13, 2008, Oakland, CA.
2. Anderson, G.M., Minser, W.E., Terry, N., Acik, L., and LeDuc, D.L. Possible role for a gene encoding fructose-1,6-bisphosphate aldolase A in nickel hyperaccumulation in *Alyssum murale*. CSUPERB Symposium, January 11-13, 2008, Oakland, CA.
3. Anderson, G.M., Minser, W.E. LeDuc, D.L. Determining the specificity of the role of a gene encoding fructose-1,6-bisphosphate aldolase A in nickel hyperaccumulation in *Alyssum murale*. ACS 20th Annual Northern California Undergraduate Research Symposium, May 3, 2008, Santa Clara, CA.
4. Cassano, J.A., Patty, C., Santamaria, J., LeDuc, D.L., Andrews, J.C. Lead nanoparticles in the aquatic fern *Salvinia minima* L. Baker. LCLS/SSRL Users' Meeting, October 15 – 18, 2008, Palo Alto, CA.
5. Cassano, J.A., Patty, C., Santamaria, J., LeDuc, D.L., Andrews, J.C. Lead nanoparticles in the aquatic fern *Salvinia minima* L. Baker. Synchrotron Use in Environmental Science, December 11 – 13, 2008, San Francisco, CA.
6. Amos, W., Xu, L., Caruso, J., and LeDuc, D.L. Metabolic responses to selenium in the hyperaccumulator, *Stanleya pinnata*. CSUPERB Symposium, January 16-18, 2009, Los Angeles, CA.
7. Cassano, J.A., Patty, C., Santamaria, J.M., LeDuc, D.L., and Andrews, J.C. Lead nanoparticles in the aquatic fern *Salvinia minima* L. Baker. CSUPERB Symposium, January 16-18, 2009, Los Angeles, CA.
8. Xu, L., Anderson, G., Banuelos, G.S., and LeDuc, D.L. ACS 21st Annual Northern California Undergraduate Research Symposium, May 3, 2009, Moraga, CA.
9. Amos, W.M., LeDuc, D.L., and Hayter, J. Insights into the selenium hyperaccumulation of *Stanleya pinnata*. LCLS/SSRL Users' Meeting, October 19 – 21, 2009, Palo Alto, CA.
10. Cassano, J.A., LeDuc, D.L., and Hayter, J.C. A model of lead uptake, detoxification, and accumulation in the aquatic fern *Salvinia minima* L. Baker. LCLS/SSRL Users' Meeting, October 19 – 21, 2009, Palo Alto, CA.
11. Amos, W.M., Huang, X., Hayter, J.C., and LeDuc, D.L. Understanding selenium metabolism and detoxification in the hyperaccumulator, *Stanleya pinnata.* CSUPERB Symposium, January 8-10, 2010, Santa Clara, CA.
12. Amos, W.M., Chan, Q., Hayter, J.D., Caruso, J., and LeDuc, D.L. Understading selenium metabolism and detoxification in the hyperaccumluator, *Stanleya pinnata*. ACS National Meeting, March 24 – 29, 2010, San Francisco, CA.
13. Power, A., Huang, X., and LeDuc, D.L. Understanding nickel and cobalt hyperaccumulation in *Alyssum murale*. CSUPERB Symposium, January 7-9, 2011, Anaheim, CA.

Workshops

1. "Chemical and Physical Properties" East Bay Science Project, July 30, 2007.
2. "The Physical Properties of Water" East Bay Science Project, August 7, 2007.
3. "Chemical and Physical Properties" Bay Area Science Project, August 14, 2007.
4. "Chemical and Physical Properties" East Bay Science Project, July 24, 2008.
5. "NASA Liftoff: Chemistry!" NASA Liftoff, June 29, 2009.
6. "The Chemistry of Life" NASA Liftoff, July 20, 2009.
7. "The Chemistry of Climate Change" NASA Liftoff, July 23, 2009.

8. “Nutrition in Space” NASA Liftoff, August 13, 2009.
9. “Classification of Matter” ACES, August 19, 2009.
10. “Recycling Water: Lessons from Earth and Space” NASA Liftoff, February 6, 2010.
11. “Chemistry in NASA” NASA Liftoff, May 15, 2010.
12. “Teaching LARGE Classes” Office of Faculty Development, CSUEB, May 17, 2010.
13. “The Search for Water: What? How? Why?” NASA Liftoff, July 19, 2010.
14. “Detecting Elements and Molecules Using Spectral Fingerprints” NASA Liftoff, July 22, 2010.
15. “STEM K-8 Curriculum Workshop” Broadcom, Inc. September 10, 2010.
16. “Teaching LARGE Classes” Back to the Bay, September 16, 2010.
17. “STEM K-8 Curriculum Workshop” Broadcom, Inc. December 17, 2011.
18. “STEM K-8 Curriculum Workshop” Broadcom, Inc. March 16, 2011.

Other Projects

1. “Transforming Course Design – Redesigning the General Chemistry Curriculum” CSU Chancellor’s Office, 2008 – 2009.
2. “A Model Community College Transfer Program for Future Mathematics and Science Teachers” S.D. Bechtel, Jr. Foundation, 2008 – 2010.
3. “Advancing Collaboration for Equity in Science (ACES)” California Postsecondary Education Commission Improving Teacher Quality State Grants Program, 2009 – 2011.
4. “NASA Liftoff”, NASA, 2009-2011.
5. Development of Foundational Science Certificate/Science Option for Liberal Studies Majors, Math and Science Teacher Initiative, CSU Chancellor’s Office. 2009 – 2011.
6. “Integrated Middle School Science Program”, National Science Foundation, 2010 – 2015.