American Chemical Society

National Awards Nomination Packet

ACS Award for Creative Advances in Environmental Science and Technology:2018
for: Yelena Sapozhnikova

Received: 10/30/2014 *Cycle Year: 3*

"For addressing and solving problems in analysis of chemical contaminants in environmental and food samples, providing practical technologies to reduce environmental and human health risk"

NOMINATOR:

Steven Lehotay
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UNITED STATES

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- Have you discussed this award nomination with the nominee? *Yes*

NOMINEE:

Yelena Sapozhnikova
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UNITED STATES

Tel: (215)233-6655
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ACS Current Member: Yes
Years of Service: 6
Present Position: Research Chemist
Industry: Government

SAFETY PROTOCOLS:

- Does the nominee employ and require good safety protocols and practices in his/her laboratory? *Yes*

SUPPORTER 1

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SUPPORTER 2

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United States Department of Agriculture

Research, Education and Economics
Agricultural Research Service

October 29, 2014

Awards Office
American Chemical Society
1155 16th Street NW
Washington, DC 20036-4801

Dear Officers:

I am pleased to nominate Dr. Yelena Sapozhnikova for the ACS Award for Creative Advances in Environmental Science and Technology. I have worked with Dr. Sapozhnikova for 3 years, and am very familiar with her latest original and innovative research. I believe Dr. Sapozhnikova's research program is fully aligned with the award's purposes: first, to develop, validate, and transfer innovative yet practical methods of analysis for chemical contaminants in food and the environment; and second, to provide information for risk assessment, environmental safety, reduction of health risk factors, and general regulatory purposes.

Dr. Sapozhnikova has been developing highly sensitive, simple, fast, accurate, inexpensive analytical methods for various chemical contaminants in environmental and food samples for 15 years in governmental and academic institutions (USDA Agricultural Research Service, National Oceanic and Atmospheric Administration, and University of California, Riverside). Dr. Sapozhnikova recognizes the need for identifying hazardous unrecognized contaminants, seeks to fill gaps in existing research, and addresses the challenge to develop new analytical approaches when none exist.

One of the creative approaches Dr. Sapozhnikova uses in her work is to create novel multiclass, multiresidue analytical methods covering a wide range of diverse contaminants in a single analysis to achieve low detection limits in a fast, inexpensive, and uncomplicated analytical method, designed to increase sample throughput and improve the monitoring of chemical contaminants. As an example, Dr. Sapozhnikova developed a method for the analysis of diverse pesticides, and persistent organic contaminants (POPs) identified by Stockholm Convention (PCBs, PBDEs, PAHs), and novel flame retardants (RFs), which allows quantitative and qualitative analysis of >200 contaminants from a single sample in a 10 minute chromatogram. This work was published in *Anal. Chim. Acta* (2013), and has already been cited 21 times in 20 months. This approach provides significant time and labor-savings compared to previous methods. The calculated sample preparation cost is ≈$2.5 per sample, and small amounts of organic solvent used for extraction leads to reduced solvent waste and minimal environmental impact. To our knowledge, this is the first study which covers a large number of novel FRs in one method combined with other legacy and emerging classes of environmental contaminants.

In a recent collaborative study with RIKILT, Institute of Food Safety, the Netherlands, Dr. Sapozhnikova conducted a research project on a novel flow injection – tandem mass spectrometry (FI-MS/MS) approach for fast screening of chemical contaminant in foods. There are few research groups in the world currently working on this concept. This study aimed to develop MS/MS identification parameters to increase confidence in identifications of chemical contaminants with retention time information in complex food samples. Reliable identification of contaminated or adulterated food constitutes one of the major challenges in food safety programs as false positives and negatives have serious health and economic consequences. The developed recommended criteria will help guide future policy decisions to establish MS-based identification criteria for analytical testing, not only in the field of food and environmental testing, but also in forensics, sports doping, and other applications involving high stakes outcomes. This work is beneficial to the analytical community, including instrument manufacturers, government, and contract laboratories using MS identification.

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Another example of providing practical technologies to reduce environmental and health risk factors is Dr. Sapozhnikova's exceptional scientific leadership on promoting research on food and environmental safety through effective education on analysis of food contaminants in developing countries. During her research career, Dr. Sapozhnikova trained, supervised and mentored multiple students and scientists. A recent example of the leadership is Dr. Sapozhnikova's service as invited instructor for the training workshop on chemical residue analysis in Azerbaijan in 2013. The Government of Azerbaijan requested technical assistance from the USDA to develop their pesticide residue testing and analysis and a National Pesticide Residue Monitoring program. Dr. Sapozhnikova provided a 2-week course covering theory and hands-on training for various government laboratories of Azerbaijan intended to conduct pesticide and veterinary drug residue analysis. After this training, Azerbaijan should better be able to export food into the internal market to benefit its economy, and provide safer food to the importing countries, including the USA.

These examples illustrate that Dr. Sapozhnikova's research is addressing and solving problems in analysis of chemical contaminants in both environmental and food arenas, leading to safer food and less harm to the ecosystem.

Sincerely,

Lead Scientist
Email: Steven.Lehotay@ars.usda.gov

Biography

Dr. Yelena Sapozhnikova is a Research Chemist at the Eastern Regional Research Center, Agricultural Research Service, United States Department of Agriculture in Wyndmoor, PA. Her research is focused on the development of novel analytical methods for pesticides, persistent and emerging organic contaminants and chemical residues in foods to increase operational efficiency and cost, and ultimately to improve food safety and reduce health risk factors. Dr. Sapozhnikova received her Ph.D. in Analytical Chemistry from the Rostov State University, Russia in 1999. She conducted her postdoctoral study (2000-2004) at the Environmental Sciences Department, University of California, Riverside working on analysis of pesticides, diverse environmental contaminants and environmental estrogens. Prior to joining the USDA, Dr. Sapozhnikova was a contract Research Chemist for the National Oceanic and Atmospheric Administration (NOAA) in Charleston, SC, where she developed and applied novel analytical methods for analysis of pesticides, flame retardants, synthetic musk fragrances, pharmaceutical and personal care products, and other emerging contaminants to assess effects of chemical contaminants to ecosystem's health.

List of 20 most significant publications

1. Han, L.; **Sapozhnikova, Y**.; Lehotay, S. J., Streamlined sample cleanup using combined dispersive solid-phase extraction and in-vial filtration for analysis of pesticides and environmental pollutants in shrimp. *Analytica Chimica Acta* **2014**, *827*, 40-46.
2. **Sapozhnikova, Y.,** Evaluation of Low-Pressure Gas Chromatography–Tandem Mass Spectrometry Method for the Analysis of >140 Pesticides in Fish. *Journal of Agricultural and Food Chemistry* **2014,** *62*, (17), 3684-3689.
3. Pennington, P. L.; Harper-Laux, H.; **Sapozhnikova, Y**.; Fulton, M. H., Environmental effects and fate of the insecticide bifenthrin in a salt-marsh mesocosm. *Chemosphere* **2014,** *112*, 18-25.
4. **Sapozhnikova, Y**. and Lehotay, S. J., Multi-class, multi-residue analysis of pesticides, polychlorinated biphenyls, polycyclic aromatic hydrocarbons, polybrominated diphenyl ethers and novel flame retardants in fish using fast, low-pressure gas chromatography–tandem mass spectrometry. *Analytica Chimica Acta***, 2013,** 758, 80-92.
5. **Sapozhnikova, Y**., Wirth, E., Schiff, K., Fulton, M. Antifouling biocides in water and sediments from California marinas. *Marine Pollution Bulletin***, 2013**, 69, 189-194.
6. Hedgespeth, M. L.; **Sapozhnikova, Y**.; Pennington, P.; Clum, A.; Fairey, A.; Wirth, E. Pharmaceuticals and personal care products (PPCPs) in treated wastewater discharges into Charleston Harbor, South Carolina. *The Science of the Total Environment***, 2012**, 437, 1-9.
7. **Sapozhnikova, Y**.; Hedgespeth, M.; Wirth, E.; Fulton, M. Analysis of selected natural and synthetic hormones by LC-MS-MS using the US EPA method 1694. *Analytical Methods***, 2011**, 3, 1079-1086.
8. Bratkovics, S. and **Sapozhnikova, Y.** Determination of seven commonly used organic UV filters in fresh and saline waters by liquid chromatography-tandem mass spectrometry. *Analytical Methods*, **2011**, 3, 2943-2950.
9. **Sapozhnikova, Y**.; Liebert, D.; Wirth, E.; Fulton, M. Polycyclic musk fragrances in sediments and shrimp tissues. *Polycyclic Aromatic Compounds*, 2010, 30, 298 - 308.
10. Winder, V. L.; **Sapozhnikova, Y**.; Pennington, P. L.; Wirth, E. F. Effects of fluoxetine exposure on serotonin-related activity in the sheepshead minnow (*Cyprinodon variegatus*) using LC/MS/MS detection and quantitation. *Comparative Biochemistry and Physiology*, Part C: Toxicological Pharmacology**, 2009**, 149, 559-65.
11. **Sapozhnikova, Y.**; Pennington, P.; Wirth, E.; Fulton, M., Fate and transport of Irgarol 1051 in a modular estuarine mesocosm. *Journal of Environmental Monitoring*, **2009**, 11, 808-814.
12. **Sapozhnikova, Y**., Wirth, E., Singhasemanon, N., Bacey, J., Fulton, M., Distribution of antifouling biocides in California marinas. *Journal of Environmental Monitoring.* **2008.** 10, 1069-1075.
13. **Sapozhnikova, Y**., Wirth, E., Schiff, K., Brown, J., Fulton, M., Antifouling pesticides in the coastal waters of Southern California. *Marine Pollution Bulletin.* **2007.** 54, 1972-1978.
14. Garcia-Hernandez, J., **Sapozhnikova, Y.V**., Schlenk, D., Mason, A.Z., Hinojosa-Huerta, O., Rivera-Diaz, J.J., Ramos-Delgado, N.A., Sanchez-Bon, G., Concentration of

contaminants in breeding bird eggs from the Colorado River Delta, Mexico. *Environmental Toxicology and Chemistry*. **2006.** 25, 1640-1647.
15. Schlenk, D., **Sapozhnikova, Y**., Cliff, G., Incidence of organochlorine pesticides in muscle and liver tissues of South African great white sharks *Carcharodon carcharias*. *Marine Pollution Bulletin.* **2005.** 50, 208-211.
16. Schlenk, D., **Sapozhnikova, Y**., Irwin, M.A., Xie, L., *Hwang, W.*, Reddy, S., Brownawell, B.J., Armstrong, J., Kelly, M., Montagne, D.E., Kolodziej, E.P., Sedlak, D., Snyder, S., In vivo bioassay-guided fractionation of marine sediment extracts from the Southern California Bight, USA, for estrogenic activity. *Environmental Toxicology and Chemistry*. **2005.** 24, 2820-2826.
17. **Sapozhnikova, Y**., Schlenk, D, McElroy, A., Snyder, S. Estrogenic activity measurement in wastewater using in vitro and in vivo methods. In: Ostrander, G.K. (Ed.). *Techniques in Aquatic Toxicology*. **2005.** CRC press, Boca Raton, Florida, pp. pp.465-477 (book chapter).
18. **Sapozhnikova, Y**., Zubcov, N., Hungerford, S., Roy, L.A., Boicenco, N., Zubcov, E., Schlenk, D. Evaluation of pesticides and metals in fish of the Dniester River, Moldova. *Chemosphere* **2005**. 60, 196-205.
19. **Sapozhnikova, Y**., Bawardi, O., Schlenk, D. Pesticides and PCBs in sediments and fish from the Salton Sea, California, USA. *Chemosphere* **2004.** 55, 797-809.
20. Schlenk, D., **Sapozhnikova, Y**., *Baquirian, J.P*., Mason, A. Predicting chemical contaminants in freshwater sediments through the use of historical biochemical endpoints in resident fish species. *Environmental Toxicology and Chemistry*. **2002.** 21, 2138-2145.

United States Department of the Interior

U.S. GEOLOGICAL SURVEY

October 27, 2014

Awards Office
American Chemical Society
1155 16th Street NW
Washington, DC 20036-4801

Dear Committee Members:

I am writing to support the nomination of Dr. Yelena Sapozhnikova for the ACS Award for Creative Advances in Environmental Science and Technology (EST). Dr. Sapozhnikova's research work focuses on development of new analytical methods for detection and measurement of diverse emerging contaminants. These methods are employed for monitoring surveys of previously unrecognized or unmonitored contaminants in marine and estuarine environments. Results from these monitoring studies guide coastal management decisions that conserve and protect natural resources and marine environments.

My particular area of research is focused on emerging contaminants in the environment, particularly, pharmaceuticals and personal care products (PPCPs). The majority of research on PPCP occurrence has been conducted in freshwater and groundwater, but much less information on PPCPs in highly saline environments has been reported. In order to minimize the potential negative impacts of increasing urban and industrial development in coastal zones, monitoring these sensitive ecosystems is critical.

Dr. Sapozhnikova, supervising a graduate student, led an effort to optimize and validate an analytical method for selected PPCPs, their metabolites and hormones, which was used to conduct a one year monitoring study to examine the presence, quantity, and spatial/temporal distribution of PPCPs in wastewater and coastal surface waters of the South Atlantic coast, as well as PPCP removal efficiency during wastewater treatment (WWTP) process. This was the first study to examine PPCPs in this region of the US. The data collected in this study established a "baseline" of PPCP concentrations in surface waters of the South Atlantic coast. This type of data is very useful for environmental risk assessment studies, as indication of the anthropogenic input into coastal systems (also valuable to other areas of environmental and social science), consumer education, and for determining technical approaches if the removal of these compounds during wastewater treatment becomes regulated in the future.

I believe this example of Dr. Sapozhnikova's research work demonstrates creativity in an important research area of environmental chemistry. Her work provides practical benefits, yielding fully validated ready-to-use analytical methodologies, while the information generated from these monitoring studies helps better understand environmental and health risks of emerging contaminants and aids in minimizing potential negative impacts of increasing urban and industrial development in coastal regions.

Please feel free to contact me if you have any questions regarding my letter of support.

Sincerely,

Edward T. Furlong, Ph.D.
Methods Research and Development Program
National Water Quality Laboratory
U.S. Geological Survey, Denver, Colorado
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303-236-3941

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October 29, 2014
Awards Office
American Chemical Society
1155 16th Street NW
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Dear Selection Committee:

I strongly endorse the nomination of Dr. Yelena Sapozhnikova for the ACS Award for Creative Advances in Environmental Science and Technology (EST). Dr. Sapozhnikova began her research career in the USA working as a postdoctoral researcher in my laboratory at the University of California, Riverside in 2000. She is an analytical chemist by training, and has been working in the area of Environmental Chemistry and Aquatic Toxicology, designing and applying innovative analytical tools to access effects of environmental contaminants on environmental and human health.

During her postdoctoral appointment, Dr. Sapozhnikova developed and utilized analytical methods for the analysis of diverse environmental contaminants in various environmental matrices: water, sediments, fish (Sharks) and mammalian tissues as well as bird eggs, and wastewater. Dr. Sapozhnikova trained numerous undergraduate and graduate students, as well as visiting scientists from developing countries (Moldova and Mexico) to promote environmental stewardship.

In one of the studies, Dr. Sapozhnikova trained a group of Mexican students and scientists, working on a collaborative project to assess concentrations of pesticides and polychlorinated biphenyls (PCBs) in eggs of breeding birds from the Colorado River delta, Mexico (Garcia-Hernandez et al. 2006; Environmental Toxicology and Chemistry 25:1640). This study estimated

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the detrimental effects of contaminants on the reproductive health of endangered species of birds, and was recognized by the Agrochemical Division of ACS by awarding Dr. Sapozhnikova a Young Scientist Research Recognition Travel Award in 2004.

Another project exemplifying Dr. Sapozhnikova's contribution to the field of environmental science was a study of organic contaminants in the Salton Sea, CA. The Salton Sea is the largest manmade lake in California, and officially designated as an agricultural drainage reservoir. The outcome of this study was evaluation of the ecological risk of the contaminants in resident fish and wildlife, which was valuable to regulatory agencies including the Salton Sea authority involved in legislative decisions. Our publication in Chemosphere (Sapozhnikova et al. 2004 Chemosphere 55: 797) describing this work has been cited at least 99 times as of October 2014, including by the World Health Organization' review for evaluation of human and mammalian toxic equivalency factors for dioxins and dioxin-like compounds, which demonstrates the high impact of the work.

Another example of Dr. Sapozhnikova's innovative research in the environmental science includes creative bridging of analytical chemistry and toxicology tools to characterize unknown potential endocrine disrupters causing estrogenic activity and fish feminization. This work on toxicity identification evaluation (TIE) combined with chemical analysis allowed us to identify previously unrecognized endocrine disrupting chemicals, providing valuable information for decision-makers and regulators. This resulted in an invited chapter for the text *Methods in Aquatic Toxicology* (edited by G. Ostrander).

These few examples are really just a minor example of the brilliant work Yelena has undertaken. She had many other co-authored publications and has been the most productive postdoctoral fellow I have ever had the pleasure of

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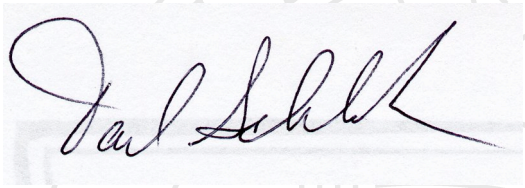
having in my laboratory. In addition to thehigh impact of Dr. Sapozhnikova's research on the environmental science and technology, Yelena is wonderful person and mentor for younger scientists. It is with great enthusiasm that I whole-heartedly recommend her for this award.

Sincerely,



Daniel Schlenk, Ph.D.
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