

Dr. Sergei Y. Tolmachev, Research Associate Professor

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Laboratory Manager, U.S. Transuranium & Uranium Registries
College of Pharmacy, Washington State University
1845 Terminal Drive, Suite 201
Richland, WA 99354-4959 USA

Tel: + 1 (509) 946 6870
FAX: + 1 (509) 946 7972
Cell: + 1 (509) 942 4095

E-mail: stolmachev@tricity.wsu.edu

Education

M.Sc. Chemical Engineering, Mendeleev University of Chemical Technology of Russia, 1993

Ph.D. Environmental Radiochemistry, Kyushu University (Fukuoka, Japan), 2001

Biosketch

SERGEI Y. TOLMACHEV is a Research Associate Professor (Radiochemistry) in the College of Pharmacy, Washington State University (WSU). Since 2007, he has managed laboratory operation and research in the fields of actinide radiochemistry and mass spectrometry, in support of internal dosimetry and actinide biokinetics research at the United States Transuranium and Uranium Registries (USTUR). At USTUR Dr. Tolmachev supervises the Radiochemistry Program and the National Human Radiobiological Tissue Repository (NHRTR) and National Radiobiology Archives (NRA) facilities – www.ustur.wsu.edu.

Dr. Tolmachev has over 15 years of experience in analytical methods development and actinide analyses in environmental and biological samples. He is expert in 'state-of-the-art' analytical instrumentation, including various types of inductively coupled plasma mass spectrometers (ICP-MS), high performance liquid chromatography and α -spectrometry systems. Dr. Tolmachev earned his *Diploma* of nuclear-technology engineering (M.S. equivalent) at the Mendeleev University of Chemical Technology of Russia (Moscow) in 1993, majoring in radiochemistry. His Master's Thesis project was accomplished at the Joint Institute for Nuclear Researches (JINR) in Dubna. After graduation, he joined the Radioanalytical Research Group at JINR. In 1997, he was awarded a scholarship by the Ministry of Education Culture and Sport (MONBUSHO) of Japan for research and Ph.D. study at Kyushu University (Fukuoka) in the field of Environmental Radiochemistry/Radioecology. His research focused on ^{210}Po , ^{36}Cl , and ^3H determination and behaviour in the environment. He developed a radioanalytical protocol for ^{36}Cl determination by projectile X-ray accelerator mass spectrometry (PX-AMS). Dr. Tolmachev was awarded the degree of *Doctor of Science* (Ph.D. equivalent) in 2001. He continued his scientific career with two post-doctoral fellowships in Japan: at the Japan Atomic Energy Research Institute (JAERI, Tokai-mura), Department of Health Physics, Internal Dosimetry Laboratory; and at the National Institute of Radiological Sciences (NIRS, Chiba), Research Center for Radiation Safety. During this period his research focused on applying ICP-MS techniques for uranium (^{234}U , ^{235}U , ^{238}U and ^{236}U) and ^{232}Th isotopic determination in human body fluids, actinide biokinetics and internal dose assessment. He established a rapid automated flow-injection ICP-MS method for uranium isotopic determination for the purpose of internal dose assessment. Dr. Tolmachev conducted (published in 2006) a milestone study of the concentration and daily excretion of uranium in urine of Japanese (to better define the exposure of the Japanese public to natural uranium). His Japanese research also included method development to apply sector field ICP-MS to measure ^{226}Ra in environmental samples.

Dr. Tolmachev is an internationally recognized scientific specialist. While at WSU he has established active scientific collaborations with the University of Technology Sydney Bio-Imaging facility, Swiss Federal Institute of Technology (ETH) Zürich Laboratory of Inorganic Chemistry and Radiation Protection Bureau at Health Canada, together with leading U.S. laboratories (Northern Arizona University, Department of Chemistry and Biochemistry; and the Savannah River Site Analytical Laboratory). He is a member of the Society of Nuclear and Radiochemical Sciences (Japan), the Japan Health Physics Society and the U.S. Health Physics Society. Dr. Tolmachev is an *ad*

hoc reviewer for Journal of Radiation Research and the Journal of Geosciences. He is fluent in Russian, Ukrainian, English and Japanese.

Selected Publications

1. T. Lynch, S. Tolmachev, A. James. *Estimating ^{241}Am Activity in the Body: Comparison of Direct Measurements and Radiochemical Analyses*. Radiat. Prot. Dosimetry, **2009**, in press.
2. A. C. James, S. Y. Tolmachev, S. L. McCord, M. J. Dobersen. *Beryllium in the Tissues of Weapons-site Workers*. USTUR-0252-08, **2008**, Available at: http://www.ustur.wsu.edu/Conferences/2008/2008_Beryllium.html
3. S. Tolmachev, M. Ketterer, D. Stuit, A. James. *Determination of Pu and Am in digested bone and soft tissue samples by SF-ICP-MS: comparison with α -spectrometry*. USTUR-0234-07, **2007**, Available at: http://www.ustur.wsu.edu/Conferences/2007/2007_RRMC.html
4. S. Tolmachev, J. Kuwabara, H. Noguchi. *Concentration and daily excretion of uranium in urine of Japanese*. Health Physics, **2006**, 91(2): 144 - 153.
5. S. Tolmachev, K. Tagami, S. Uchida. *Determination of ^{226}Ra in surface waters using high-resolution inductively coupled plasma mass spectrometry after selective extraction*. Proceedings of the 2nd International Conference on Radioactivity in the Environment. **2005**, 592 - 596.
6. S. Tolmachev, J. Kuwabara, H. Noguchi. *Flow injection extraction chromatography ICP-MS for Th and U determination in human body fluids*. J. Radioanal. Nucl. Chem., **2004**, 261 (1): 125-131.
7. J. Kuwabara, S. Tolmachev, H. Noguchi. *The development of flow injection technique for rapid uranium determination in urine samples*. J. Nucl. Sci. Technol., **2002**, 3: 556 - 559.
8. S. Tolmachev, S. Mitarai, N. Momoshima, M. Yamamoto, Y. Maeda, T. Nakashima. *Application of PXAMS technique for Cl-36 analysis in soil collected at Semipalatinsk Nuclear Test Site*. J. Radioanal. Nucl. Chem., **2002**, 251(2): 217 - 220.
9. S. Yu. Tolmachev, N. Momoshima, Y. Maeda. *Role of suspended particulate matter and colloids in ^{210}Po behavior in coastal waters*. Proceedings of the 1st International Conference on Radioactivity in the Environment. **2002**, 481 - 484.
10. S. Yu. Tolmachev, S. Ura, N. Momoshima, M. Yamamoto, Y. Maeda. *Determination of Cl-36 by Liquid Scintillation Counting Technique From Soil Collected at Semipalatinsk Nuclear Test Site*. J. Radioanal. Nucl. Chem., **2001**, 249(3): 541 - 545.
11. S. Yu. Tolmachev, S. N. Dmitriev, O. D. Maslov, L. G. Molokanova, M. V. Gustova, A. V. Sabel'nikov. *Determination of Natural and Technogenic Actinides in Natural Waters by Photofission-based Method*. Radiokhimiya (in Russian), **1999**, 41(5): 469 - 473.
12. O. D. Maslov, S. N. Dmitriev, L. G. Molokanova, S. Yu. Tolmachev. *Low-level measurements of thorium and neptunium in environmental samples using the (γ , f) reaction*. J. Radioanal. Nucl. Chem., **1997**, 226(1 - 2): 181 - 183.