

## Tetyana Konak, PhD

Phone: 205-886-2180

E-mail: [Tetyana.Konak@gmail.com](mailto:Tetyana.Konak@gmail.com)

13500 Chenal Pkwy apt 220

Little Rock, AR 72211

**Current position:** Postdoctoral fellow. National Center for Toxicological Research, U.S. Food and Drug Administration, Jefferson, AR, 72079

**Area of Interest:** Multidisciplinary research in areas related to lasers, optics, material science, bioimaging, neurobiology, statistical analysis that allows to contribute to interdisciplinary teams, adapt to complex and changing situations and technologies, and solve cross-fields-related research problems.

### Education and Training:

|                           |  |
|---------------------------|--|
| September 2014 - now      | University of Arkansas for Medical Science. Regulatory Science Certification Program. Graduation expected in May 2016                                  |
| June 2013 - now           | Postdoctoral fellow, National Center for Toxicological Research, U.S. Food and Drug Administration, the Division of Neurotoxicology (DNT), Bioimaging. |
| September 2015 - now      | Regulatory Science Certification (anticipated obtaining the certificate in May 2016): the FDA imposed regulation issues (pharmacology/biology).        |
| August 2010 - May 2013    | The University of Alabama, Birmingham (UAB), AL; PhD in Physics; Research Advisor: Professor Sergey Mirov.   |
| May 2009 - August 2010    | The University of Alabama, Birmingham (UAB), AL; MS Degree in Physics; Research Advisor: Professor Sergey Mirov.                                       |
| January 2006 - May 2009   | The University of Alabama, Tuscaloosa, AL; Physics.  |
| September 2002 - May 2003 | Kharkiv National University (KNU), Kharkiv, Ukraine; MS Degree in Mathematics.   |
| September 1998 - May 2002 | Kharkiv National University (KNU), Kharkiv, Ukraine; BS Degree in Mathematics.   |

**Dissertation:** "Optical and Electrical Characterization of Transition Metal Doped II-VI Mid-IR Laser Materials" under the supervision of Dr. S. Mirov. The dissertation research is related to the development of technology for producing new lasing materials, tunable lasers, and providing insight into their optical and electrical properties.

### Research Experience

- Development and validation of quantitative biomarkers and identification of biological pathways associated with the expression of neurotoxicity, through data analysis.
- Employment of Magnetic Resonance Imaging (MRI) approaches for the quantitation of metabolic changes in living tissues. The application of full brain MRI imaging in the living animal to target specific brain areas.
- Quantitative approaches to correlate MRI with pathology through digitization and quantification of histology data. Preparation of "digital pathological maps" using image analysis software.
- Developing and analysis of new laser materials, including quantum dots, nano films, and bulk crystals
- Physics and technology of transition metal doped media for optical and electrical excitation.

- Development and application of commercial tunable lasers, development of laser based techniques.

### Teaching Experience

- May 2010 - May 2013: Research assistant, The University of Alabama, Birmingham (UAB), AL.
- September 2009 - May 2010: Teaching assistant, The University of Alabama, Birmingham (UAB), AL.
- January 2006 - May 2009: Teaching assistant, The University of Alabama, Tuscaloosa, AL.
- September 2003 - January 2004: Instructor in National Aerospace University (NAU), Kharkiv, Ukraine.

### Expertise/ Skills

- Programming experience in Python, Mathematica, Maple, MatLab
- Mathematics (geometry): fundamental physical and mathematical training, research in several areas: geometry of submanifolds of Finsler spaces, mean curvature flows, geometry of foliations and distributions, harmonic maps, standard three-dimensional geometries; statistics.
- Data analysis (general): Developing new algorithm and new tools for data analysis in MRI
- Optics: Strong theoretical and experimental background in designing and developing of optical materials (solid state lasers). Preparation and characterization of pure and transition metal doped II-VI semiconductors;
- Technical Expertise: Development of new ideas, implementation of new methods, and relevant technical expertise (chemical/ engineering/ physics/ programming/ mathematics and combination of such).
- Engineering: Experience in designing new set up based on a simple sketch, block-flow diagrams or piping and instrumentation diagram;
- Interdisciplinary methods: A unique combination of mathematics, physics and engineering fundamentals that allows to define, analyze, and solve interdisciplinary type of in multidisciplinary environments, contribute to multi-faceted projects with significant technical complexity using a broad systems perspective.
- Learning: Able to learn new methods and technologies and utilize them quickly.

### Publications and Presentations

1. Joseph Hanig, Merle G Paule, Jaivijay Ramu, Larry Schmued, Tetyana Konak, Srinivasulu Chigurupati, William Slikker, Sumit Sarkar, Serguei Liachenko. The Use of MRI to Assist the Section Selections for Classical Pathology Assessment of Neurotoxicity. Regulatory Toxicology and Pharmacology (Impact Factor: 2.14). 09/2014; 70(3). DOI: 10.1016/j.yrtph.2014.09.010.
2. S. Liachenko, J. Hanig, J. Ramu, T. Konak Quantitative assessment of MRI T2 response to kainic acid neurotoxicity in rats in vivo (accepted for publications)
3. Tetyana Konak, Michael Tekavec, Vladimir V. Fedorov, and Sergey B. Mirov, Optical, electrical, and laser characteristics of  $\gamma$ -irradiated pure and transition metal doped II-VI semiconductors (under review).
4. J. Peppers, T. Konak, D. V. Martyshkin, V. V. Fedorov, S. B. Mirov Spectroscopy and mid-IR lasing of  $\text{Cr}^{2+}$  ions in ZnSe/ZnS crystals under visible excitation, 01/2014; DOI: 10.1117/12.2040798.
5. V. Fedorov, T. Konak, J. Dashdorj, M. E. Zvanut, S. Mirov Optical and EPR spectroscopy of Zn:Cr:ZnSe and Zn:Fe:ZnSe crystals, Optical Materials, 11/2014; 37. DOI: 10.1016/j.optmat.2014.06.004.
6. T. Konak, V. Fedorov, M. E. Zvanut, J. Dashdorj, S. Mirov, Effect of Zn Vapor Annealing on Optical and Electrical Properties of Mid-IR  $\text{TM}^{+2}$ :II-VI Gain Media EPSCoR Science and

Technology Open House, Kellogg Hotel and Conference Center, Tuskegee, AL, April 13-14, 2012. Presentation.

7. T. Konak, M. Tekavec, V.V. Fedorov, and S.B. Mirov, Effects of  $\gamma$ -irradiation on optical, electrical, and laser characteristics of pure and transition metal doped II-VI semiconductor Photonics West 2011. Presentation.