Kiril Tuntevski

Former WV-INBRE intern Kiril Tuntevski is currently a student in the doctoral program at the Department of Neurobiology and Anatomy at West Virginia University School of Medicine and in the Neural Engineering Laboratory under the baton of Dr. Sergiy Yakovenko. While an undergraduate student in biology and chemistry at the University of Charleston, Kiril was a part of Dr. Slawomir Lukomski's laboratory at West Virginia University where he participated in a study that aimed to utilize species-specific genetic markers for detection of members of the *Aspergillus* species, a genus comprised of opportunistic fungal pathogens and allergens. The work was a part of a larger WV NanoSAFE effort aimed at rapid PCR-based identification of clinically and environmentally relevant agents. The results of the study were published in the American Society for Microbiology's Applied and Environmental Microbiology journal in October 2013 (AEM.02835-13).

In the Yakovenko lab, Kiril is working on problems in computational neuroscience. For example, the spinal central pattern generator (CPG) circuit involved in mammalian locomotion represents an example of a central nervous system network directly associated with the repetitive behavior demanded by locomotor tasks, which becomes damaged in many neurological conditions such as stroke or traumatic brain injury. For this purpose, the lab uses mathematical modeling to represent the CPG as a set of four intrinsically coupled leaky integrators, whereby contralateral flexor-extensor motor neuron populations are coupled by excitation, while contralateral flexor-flexor and extensor-extensor populations are coupled by inhibition, an approach which is readily translatable between clinical and experimental animal models. In conjunction, the approach employs various *in vivo* preparations in animal models allowing for multichannel recording directly from the motor cortex – data which is further analyzed by statistical reduction approaches such as modified versions of principal component analysis (PCA), non-negative matrix factorization (NNMF), as well as various holistic modeling approaches of neuronal population activity. The research is ultimately aimed at optimizing rehabilitation strategies through understanding the dynamic multi-parameter processes that govern human walking.