ENVIMOD
Univerzita J. E. Purkyně

UNIVERZITA J. E. PURKYNĚ V ÚSTÍ NAD LABEM
Fakulta životního prostředí

Srdečně tímto zveme všechny zájemce na přednášky Dr. Stevna Rippa
z Center for Environmental Biotechnology, University of Tennessee, Knoxville (USA),
na téma:

1. **Illuminating environmental monitoring with living bioreporters**
2. **New insights into in vivo bioluminescent imaging using a human optimized bacterial luciferase**

Které se uskuteční

V pondělí 15. 4. 2013 od 16.00 hodin v učebně KV404 v budově Fakulty životního prostředí UJEP (Králova výšina 7, Ústí n. L.) – **přednáška 1**

Ve středu 17. 4. 2013 od 11.00 hodin v aule MF-01.41 („purpurový sál“) multifunkčního centra v areálu kampusu UJEP (Pasteurova 1, Ústí nad Labem) – **přednášky 1 i 2**

Přednášky jsou určeny všem zájemcům, vítána bude široká studentská, akademická i ostatní veřejnost. Budou vedeny v anglickém jazyce.

Prosíme případné zájemce, aby se předběžně ozvali na josef.trogl@ujep.cz (Dr. Trögl).

evropský sociální fond v ČR | EVROPSKÁ UNIE | MINISTERSTVO ŠKOLSTVÍ, MLÁDEŽE A TĚLOVÝCHOVY | OP Vzdělávání pro konkurenceschopnost
INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ

(CZ.1.07/2.2.00/28.0205) „Modernizace výuky technických a přírodovědných oborů na UJEP se zaměřením na problematiku ochrany životního prostředí“ – **ENVIMOD**

Abstrakty přednášek

Steven Ripp, Ph.D.
The University of Tennessee Center for Environmental Biotechnology, 676 Dabney Hall, Knoxville, Tennessee 37996, USA

1. Illuminating environmental monitoring with living bioreporters

Microorganisms intimately interact with and react to their environment and are well skilled at meticulously sensing and continuously responding to the chemical, physical, and biological stimuli that constantly impact their habitats. The ability of microorganisms to perceive their world serves as a powerful tool towards our understanding of ecosystem and environmental change, if we can effectively interpret the information the microbes are trying to convey. One approach for doing so is the application of reporter gene technology. Genetic engineering techniques permit the strategic labeling of microorganisms with reporter genes that link biological activity to easily measured signaling outputs. These outputs, typically centered on colorimetric, fluorescent, or bioluminescent signals, provide the cues and information necessary for monitoring, understanding, and describing complex environmental ecosystems. The science, applications, and advances of reporter gene technology will be discussed to better reveal what the microbial world is trying to tell us and how we can apply that information towards improved ecological monitoring.

2. New insights into *in vivo* bioluminescent imaging using a human optimized bacterial luciferase

Bioluminescent imaging is an emerging biomedical surveillance strategy that uses external cameras to noninvasively detect light generated *in vivo* in small animal models of human physiology or *in vitro* in tissue culture or tissue scaffold mimics of human anatomy. At the core of this technology are cells carrying light emitting reporter genes that function as biological flashlights to reveal cellular and molecular functions. Despite the transformative nature of pre-clinical bioluminescent imaging, it has remained stagnant due to its near exclusive reliance on a single type of reporter gene – firefly luciferase (*luc*) – that has changed little since its introduction as a sensor target in 1986. Firefly luciferase's reliance on a substrate (luciferin) to activate its light emission function results in single time point data that is disruptive toward the needs of high-throughput screening. As an alternative, we have synthetically optimized bacterial luciferase (*lux*) to efficiently express under eukaryotic genetic controls to create a 'humanized' substrate-free bioluminescent reporter system capable of continuous, real-time bioimaging within living subjects. This re-engineered bacterial luciferase gene cassette presents an alternative method for localization and evaluation of human cell lines, both in cell culture and small animal models, that can be utilized with existing equipment and imaging protocols.