



e_Connections

feature

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in the news

in memory

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Newsletter of the Virginia Bioinformatics Institute at Virginia Tech

VBI scientists publish in PLoS ONE

Recent work completed by VBI researchers and colleagues from the University of Maryland School of Medicine is now publicly available in an online publication. “Plasmids and Rickettsial Evolution:Insight from *Rickettsia felis*” was featured in the March 7, 2007 edition of PLoS ONE. The research introduces a new classification system for *Rickettsia* that may assist researchers in the way they approach the development of diagnostics and vaccines for the virulent rickettsial pathogens.

gentleman’s clubs and learned societies. Now the debates take place on the internet with blogs and wikis creating a truly global conversation. PLoS ONE is a step towards a scientific journal that serves the needs of the 21st century, rather than those of the 1600s.”



Chris Surridge

PLoS ONE is strictly an online publication that features research from all scientific disciplines. It operates under a partnership between PLoS staff and the publication’s international advisory and editorial boards. www.plosone.org

VBI researchers Joseph Gillespie, Joshua Shallom, Anjan Purkayastha, and VBI Executive and Scientific Director Bruno Sobral, along with University of Maryland colleagues Magda Beier, Mohammed S. Rahman, Nicole C. Ammerman, and Abdu F. Azad (the senior author) contributed to the paper.

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The inclusion of the work in PLoS ONE makes it freely and immediately available to the public, giving the authors the opportunity to receive feedback from a wide audience. Just last year, the Public Library of Science (PLoS), which is a non-profit organization composed of scientists and physicians committed to making scientific and medical literature freely available to the public, launched the community-based online forum. PLoS ONE is devoted to open access and community engagement and places greater importance on post-publication peer review. If a paper meets the publication’s technical standards, it is then posted online and made available for anyone to review. Anyone can register as a user of PLoS ONE and all users have tools available to add comments, questions, annotations, and ratings to each article. These tools make it possible to begin open discussions about the published work.

PLoS ONE Managing Editor Chris Surridge explains, “PLoS ONE is getting back to the basic point of science publishing: providing the results of reliable scientific research to anyone who wants to read them and empowering them to discuss its implications. When the first scientific journals like the *Proceedings of the Royal Society* were launched, scientific debate took place in

New classification for *Rickettsia*

- Some species of *Rickettsia* are known to cause harmful diseases in humans, while others have been identified as emerging pathogens and critical agents for the development of bioweapons
- The traditional rickettsial classification system divides members of the genus into three categories – spotted fever group, typhus group, and ancestral group
- The new classification system highlighted in the study includes the addition of a fourth lineage—transitional group *Rickettsia*—that provides a framework to support some of the known evolutionary relationships of these diverse bacteria
- The results offer insight into the evolution of a plastic plasmid system in *Rickettsia*

Plant growth powerhouse

Virginia Tech's new plant growth facility is a prime example of how the university is providing the necessary tools to foster campus-wide research projects involving different disciplines.

The Biological Sciences-VBI Plant Growth Facility officially opened its doors to the university community on May 1. Attached to the Ecosystems Simulation Laboratory on Smithfield Plantation Road, the 3,240-square-foot facility provides researchers with the equipment needed to grow plants under very specific conditions.

According to Erik Nilsen, executive director of the new research facility and Virginia Tech biology professor, "The facility will act as a focus point for promoting interdisciplinary research and interactions among faculty and students in plant sciences from across campus and the region. The Department of Biological Sciences is excited to have a state-of-the-art plant growth facility to enhance our competitiveness for research funding and promote scholarship in the plant sciences."

Precise control of environmental conditions, as well as the ability to consistently provide these conditions, is important for the success of many plant-related research projects. The plant growth areas in the Biological Sciences-Plant Growth Facility give researchers the ability to control a wide range of parameters. Users can create multiple environments and observe the effects of specifically defined conditions on plants. In addition, they can recreate a certain environment over and over.

State-of-the-art control

The facility features five large plant growth areas with state-of-the-art computer-regulated control systems. Researchers can use this technology to control internal temperature, humidity, and light to create a wide range of environments. A smaller preparation area includes a mist bench and is available for propagating plant material for research projects. In addition, the facility provides watering and pest maintenance services for all facility users and external climatic data is recorded by an onsite weather station.

The plant growth facility has been designed as a university service center and operates on a cost recovery basis. Any researcher within the Virginia Tech community can use the services available at the center. The weekly user fee for the center is \$25 per bench.



"We are very pleased to be working closely with the Department of Biological Sciences at Virginia Tech in setting up this cost recovery facility for plant growth resources," said Bruno Sobral, VBI's executive and scientific director. "The facility operates on the same cost recovery model that has proven to be successful for other resources at VBI. The services are available to anyone on the Virginia Tech campus who has an interest in growing plants under carefully defined conditions."

For questions about the facility or to arrange a tour please contact Erik Nilsen at enilsen@vt.edu.

VBI e_Connections

VBI e_Connections is a quarterly publication of the Virginia Bioinformatics Institute produced by the Public Relations team. The newsletter includes feature articles, technology updates as well as interviews that may be of interest to VBI's audiences. Contributions are welcomed.

Please direct submissions to newsletter-editor@vbi.vt.edu
 Newsletter team: Susan Bland: Editor; Barry Whyte: Editor; June Mullins: Graphic design.

For further information, please contact:
 Barry Whyte at Tel: 540-231-1767, email: whyte@vbi.vt.edu
 Website: www.vbi.vt.edu

Language created for describing genes

United Press International — A U.S.-led international group of scientists has expanded a lingua franca used to describe the activities of genes in living organisms.



The expansion is part of the unified language called Gene Ontology, which provides terms that scientists can use to describe the complex events that occur when a pathogenic or beneficial microbe encounters its host.

The initiative is part of the Plant-Associated Microbe Gene Ontology (PAMGO) project, a recently-established interest group of the worldwide Gene Ontology Consortium, supported in part by the U.S. National Science Foundation.

Professor Brett Tyler of the Virginia Bioinformatics Institute, located at Virginia Tech, said, "By providing a precise vocabulary for the functions of these genes, scientists can compare among microbes the many processes that make up the interplay between a microbe and its host."

The PAMGO consortium is a collaboration of the Virginia Bioinformatics Institute, Cornell University, North Carolina State University, the University of Wisconsin-Madison, The Institute of Genomic Research and Wells College.

Source: United Press International, February 28, 2007

Eubank gives plenary lecture at BioWire 2007 workshop



Stephen Eubank

Dr. Stephen Eubank, Deputy Director of the Network Dynamics and Simulation Science Laboratory at VBI, was the invited plenary speaker at the international BioWire 2007 workshop in Cambridge, England (April 2-5, 2007). The BioWire workshop focuses on the "bioinspired" design of networks, in particular wireless networks and self-organizing properties of biological networks. The BioWire workshop brings

together scientists with primary interests in applications and researchers whose principal focus may be methodologies. Dr. Eubank's talk was entitled "Network Based Epidemiology or Epidemiologically Based Networks"

Calendar of VBI Sponsored Events

- September 6-7 VBI 2nd Annual Research Symposium, Mountain Lake Hotel, Pembroke, VA

See calendar of events at: www.vbi.vt.edu

Luso-American Education Foundation funds undergraduate at VBI

Fernando Laranjeira de Freitas, an undergraduate student from the University of Porto in Portugal, has been visiting the Virginia Bioinformatics Institute since March and working with Dr. David Samuels on models of DNA strand binding energy. The Luso-American Education Foundation, a private Portuguese institution that fosters cooperation between the United States and Portuguese society, has funded the visit. The research is in collaboration with Dr. Luisa Pereira of the Institute for Pathology and Molecular Immunology at the University of Porto, Portugal.

VBI Scientific Publications

Loss of a universal tRNA feature

Wang C, Sobral BW, Williams KP

Journal of Bacteriology 2007: **189**(5) 1954-1962.

Scientists at the Virginia Bioinformatics Institute have reported in the *Journal of Bacteriology* that two alphaproteobacteria lack the universal extra guanylate nucleotide typically found in the transfer RNA molecule tRNA^{His}. tRNAs are the molecules responsible for decoding sequence information specified by messenger RNA molecules, information which is ultimately encoded by the DNA template. tRNA^{His} is the specific tRNA that assists in incorporating the amino acid histidine into new proteins. Histidine residues make essential contributions to protein structure as well as the catalytic mechanisms of enzymes and must be reliably incorporated during the process of translation. Until now, bacterial, archaeal, and eukaryotic tRNAs have always been found with an extra guanylate residue at the 5' end of the tRNA molecule. The scientists, led by Kelly Williams of VBI, have shown that tRNAs carrying the amino acid histidine in the alphaproteobacteria *Sinorhizobium meliloti* and *Caulobacter crescentus* apparently lack the universal guanylate residue.

Comparison of sampling techniques for parallel analysis of transcript and metabolite levels in *Saccharomyces cerevisiae*

Martins AM, Sha W, Evans C, Martino-Catt S, Mendes P, Shulaev V

Yeast 2007: **24**(3):181-188.

Scientists at the Virginia Bioinformatics Institute have evaluated several techniques to sample and process yeast cultures for parallel analysis of the transcriptome and metabolome. The evaluation was made by measuring the quality of the RNA obtained with ultraviolet spectroscopy, capillary electrophoresis and microarray hybridization. The protocol developed involves rapid collection by spraying the sample into -40 °C tricine-buffered methanol (as previously described for yeast metabolome analysis), followed by the separation of cells from the culture medium in low-temperature rapid centrifugation. Removal of the residual methanol is carried out by freeze-drying the pellet at -35 °C. RNA and metabolites can then be extracted from the same freeze-dried sample obtained with this procedure. This enables researchers to perform time-course experiments that provide insight into a system's dynamics and which in turn can be used for mathematical modelling.

We remember



On the morning of April 16, 2007, the Virginia Tech campus community witnessed a tragedy of unprecedented proportion. The loss of life of over 30 students and faculty has saddened the nation and the world.

The day following the tragedy, the campus held a convocation ceremony that hosted speakers such as President George W. Bush, Governor of Virginia Tim Kaine, University President Charles W. Steger, and internationally known poet and Professor of English Nikki Giovanni. Each speaker offered words of condolence and hope to the grieving families and friends. In the days that followed, employees of the Virginia Bioinformatics Institute also met to talk about the events and pay respect to those who lost their lives in the tragedy.

Today, the Virginia Tech campus is still decorated with ribbons, candles and memorials honoring those who died. Many visitors continue to come and pay their respects and share in the community's grief.



VBI employees observe a moment of silence after coming together to pay respect to those who lost their lives in the tragic events of April 16.

