# Waggoner Center

for Alcohol & Addiction Research

The University of Texas at Austin 2500 Speedway, MBB 1.124 Austin, Texas 78712 USA

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# Waggoner Center for Alcohol & Addiction Research

## THE UNIVERSITY OF TEXAS AT AUSTIN

#### NEXT-GENERATION GENE SEQUENCING TECHNOLOGY

## **Our Mission**

To develop solutions for the prevention and cure of alcoholism and related illnesses.

> Above left: Dr. Vishwanath Iyer

Above right: Dr. R. Dayne Mayfield The University of Texas at Austin has acquired new technology targeted at better deciphering the genetic basis of complex disease systems. The SOLiD System from Applied Biosystems generates massively parallel genomic profiles of various eukaryotic organisms. This technology, also known as "next-generation sequencing," is fast becoming the industry standard in DNA sequencing.

Supported by the Institute for Cellular and Molecular Biology, the Texas Institute for Drug and Diagnostic Development, and the Center for Systems and Synthetic Biology, the SOLiD System is available to the entire life sciences community at UT Austin.

Waggoner Center members **Dr. Vishwanath lyer** and **Dr. R. Dayne Mayfield** will use the new technology in various alcohol-related studies.

Our understanding of cellular function and complex diseases increased dramatically with genome-wide expression studies using cDNA microarrays to examine large numbers of known RNA transcripts simultaneously. Numerous laboratories have performed gene expression studies utilizing microarrays to identify transcripts that change as a result of drug abuse. However, these hybridization-based studies are limited by the reliance upon known genome sequence, potential cross-hybridization, and a limited dynamic range of signal intensities.

Next-generation sequencing technology will likely revolutionize whole transcriptome profiling. It allows detection of all known and novel RNAs present in biological samples without bias toward known transcripts. Thus, the expression of all coding and non-coding RNAs, alternative splicing events, and expressed single nucleotide polymorphisms (SNPs) can all be identified in a single experiment. The technology allows unparalleled accuracy and intricacy in the detection of transcriptome differences.

The lyer lab is using the technology to identify the target sites of transcriptional regulatory proteins across the genome at high resolution, and to examine dynamic chromatin remodeling across the genome. The new technology makes it possible to observe differences in the behavior of the two nearly identical copies of each chromosome in a cell, which was not possible with earlier approaches.

Dr. Mayfield will profile transcriptional regulation in human brain regions that are known substrates of reward circuitry involved in the development of alcohol and nicotine dependence. Understanding gene expression changes resulting from alcohol and nicotine abuse (and the resulting phenotypes) will accelerate treatment and prevention strategies.

www.utexas.edu/research/wcaar

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Right: The Most Reverend Desmond Tutu and Dr. Adron Harris at UNC Chapel Hill

> Below: Dr. Mark Harnett



#### NEWS

Chancellor Holden Thorp and Graduate School Dean Steve Matson of The University of North Carolina at Chapel Hill invited **Dr. R. Adron Harris** to speak at UNC Chapel Hill's 2009 doctoral hooding ceremony, held May 9, 2009. In choosing a speaker, a selection committee considered graduates of UNC's doctoral program with significant subsequent careers. Dr. Harris was recommended based on his numerous research accomplishments and commitments to higher education. That evening Dr. Harris attended a dinner as an honored guest along with UNC's general Commencement speaker, **The Most Reverend Desmond M. Tutu,** Anglican Archbishop Emeritus of Cape Town, winner of the Nobel Peace Prize, and renowned South African anti-apartheid campaigner.

**Dr. R. Adron Harris** was the featured speaker at the 2009 Distinguished Speakers Series hosted by the Mind Science Foundation (MSF), held March 16, 2009, in San Antonio. A private foundation, the MSF funds cutting-edge research and educational programs focused on the mind, brain, and human consciousness. Dr. Harris spoke on the molecular biology of alcoholism and the complex relationships between genes, addiction, and the brain. In addition to the lecture, Dr. Harris and Dr. Paul Inmundson, MSF Board Vice-Chair and Acting Executive Director, were interviewed on San Antonio's morning show, Great Day SA.

**Dr. Mark Harnett** (Morikawa lab) completed a distinguished graduate career in May 2009. His honors and awards include a first-author

publication in the highly rated peer-reviewed journal *Neuron*, a Fred Murphy Jones & Lindsey Bruce Endowed Fellowship, a Graduate School Continuing Fellowship, and a National Science Foundation Predoctoral Fellowship. Dr. Harnett begins a position as a postdoctoral fellow with Dr. Jeffrey C. Magee at Janelia Farm Research Campus, Howard Hughes Medical Institute, in September 2009.



## Building a Partnership

Individual, foundation and corporate support is essential to the continued growth and success of this world-class research center. To support the Waggoner Center for Alcohol and Addiction Research, please visit:

www.cns.utexas.edu/development/outright.asp

or contact:

UT Austin Development Office College of Natural Sciences Office of the Dean 1 University Station G2500 Austin, TX 78712-0548

or call: 512-471-3299

#### **HONORS & AWARDS**

**Dr. Michael Spinetta**, former graduate student in the Schallert lab, received one of three Outstanding Dissertation Awards of \$5,000 each from the Graduate School Awards Program, sponsored by the University Co-op. Graduate Studies Committee Chairs submit nominations to recognize outstanding doctoral dissertations. The title of Dr. Spinetta's thesis: *Ethanol and Retrograde Amnesia: Can Rats Have Blackouts and Does Caffeine Help?* 

Two researchers received the prestigious National Research Service Award (NRSA) for Postdoctoral and Predoctoral Fellows from the National Institute on Alcohol Abuse and Alcoholism:

**Dr. Regina Mangieri** (Gonzales lab) "The Role of the Endogenous Cannabinoid System in Ethanol Self-Administration"

**Brian Welsh** (Mihic Lab) "Single Channel Characterization of Ethanol Action on the Glycine Receptor"

In addition to the NRSA, Mr. Welsh received a David Bruton, Jr. Graduate School Fellowship with a stipend of \$1,000 for the 2009-2010 academic year.

#### DOCTORAL AWARDS

**Dr. Michelle Dupre** (Mihic Lab), December 2, 2009 The Structure of the TM2-3 Linker in the Alpha1 Glyr and its Role in Gating and Modulation

**Dr. Mark Harnett** (Morikawa Lab), May 12, 2009 Burst Timing-Dependent Plasticity of NMDA Receptor-Mediated Synaptic Transmission in Midbrain Dopamine Neurons: A Putative Cellular Substrate for Reward Learning

**Dr. Elaina Howard** (Gonzales Lab), May 11, 2009 Dopamine Concentrations in Nucleus Accumbens Subregions are Differentially Affected by Ethanol Administration

**Dr. Martin Job** (Gonzales Lab), February 23, 2009 The Role of the  $\mu$ -opioid Receptors in the Mechanism of Ethanol-Stimulated Mesolimbic Dopamine Release

**Dr. Teh-Sheng Ma** (Schallert lab), May 1, 2009 Rodent Ultrasonic Mating Call as a Biomarker for Oromotor Deficits in Parkinsonian Animal Model

#### Dr. Angela Ozburn

(Harris/Blednov Labs), April 23, 2009 Comparison of Ethanol-Related Behaviors and FosB Mapping in Hybrid Mice with Distinct Drinking Patterns





**Brian Welsh** 

#### PUBLICATIONS

Ahrens AM, Ma ST, Maier EY, Duvauchelle CL, **Schallert T** (2009) Repeated intravenous amphetamine exposure: rapid and persistent sensitization of 50-kHz ultrasonic trill calls in rats. Behav Brain Res 197:205-209.

Atkinson NS (2009) Tolerance in Drosophila. J Neurogenet:1-10.

**Blednov YA**, **Harris RA** (2009) Deletion of vanilloid receptor (TRPV1) in mice alters behavioral effects of ethanol. Neuropharmacology. (In press.)

Ciucci MR, Ahrens AM, Ma ST, Kane JR, Windham EB, Woodlee MT, **Schallert T** (2009) Reduction of dopamine synaptic activity: degradation of 50-kHz ultrasonic vocalization in rats. Behav Neurosci 123:328-336.

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Killion PJ, **Iyer VR** (2008) ArrayPlex: distributed, interactive and programmatic access to genome sequence, annotation, ontology, and analytical toolsets. Genome Biol 9:R159.

Li N, Ebright JN, Stovall GM, Chen X, Nguyen HH, Singh A, Syrett A, **Ellington AD** (2009) Technical and Biological Issues Relevant to Cell Typing with Aptamers. J Proteome Res. 8(5):2438-48.

Li W, **Aldrich RW** (2009) Activation of the SK potassium channel-calmodulin complex by nanomolar concentrations of terbium. Proc Natl Acad Sci U S A 106:1075-1080.

**Mayfield RD**, **Harris RA** (2009) Gene expression profiling in blood: new diagnostics in alcoholism and addiction? Neuropsychopharmacology 34:250-251.

### **Useful Websites**

Texas Commission on Alcohol and Drug Abuse www.tcada.state.tx.us

Addiction Science Research and Education Center <u>www.utexas.edu/research</u> <u>/asrec</u>

National Institute on Alcohol Abuse and Alcoholism (NIAAA) www.niaaa.nih.gov

Research Society on Alcoholism (RSA) www.rsoa.org

International Society for Biomedical Research on Alcoholism (ISBRA) www.isbra.com

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The Waggoner Center for Alcohol and Addiction Research was established in 1999 at The University of Texas at Austin. The Center was made possible by a donation from M. June and J. Virgil Waggoner and matching funds from UT Austin. The mission of the Center is to create a premier research center for alcohol and addiction research, thereby developing solutions for the prevention and cure of these diseases.

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R. Adron Harris, Ph.D.

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#### www.utexas.edu/research/wcaar

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#### **PUBLICATIONS** (continued)

**Mayfield RD**, **Harris RA**, Schuckit MA (2008) Genetic factors influencing alcohol dependence. Br J Pharmacol 154:275-287.

Nielson R, Kaehr B, **Shear JB** (2009) Microreplication and design of biological architectures using dynamic-mask multiphoton lithography. Small 5:120-125.

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