

Protein Center's Success Nets \$5.4 Million More

A grant from the National Institutes of Health (NIH) will provide the Center for Protein Structure and Function with more than \$5.4 million over the next five years to continue the research it has established during the last decade.

The goals of the grant are to strengthen collaboration between investigators and allow them to develop promising new approaches to biomedical research.

The new funds will help expand the five already established core facilities within the center and provide start-up funds to scientists with innovative ideas for new research projects.

Core facilities are highly interactive, allowing an investigator to develop a project through all stages from identifying specific proteins of biomedical significance.

Center projects emphasize the development and understanding of the structure and function of proteins that could lead to improved treatments of human diseases such as cancer, heart disease, osteoporosis,

the flu and other conditions.

Over the past 10 years, the university has provided substantial start-up funds for 12 new tenure-track faculty members in biological sciences and chemistry and biochemistry at the University of Arkansas, and at UAMS. This commitment allows junior investigators to gain the time and tools they need to succeed. Junior investigators have reduced teaching loads and can devote at least half of their time to research.

Those who began at the junior level have excelled to the level of mid-career investigators, and have now secured their own major research funding.

Researchers affiliated with the center have brought in more than \$60 million in grant support since the center was founded in 2000.

The grant is funded by the Centers of Biomedical Research Excellence (COBRE) program of the National Center for Research Resources, a part of NIH.

Senior investigators

Frank Millett - director
Roger Koeppel - coordinator

Bill Durham
James Hinton
Robert Gawley
Jackson Lay
Peter Pulay
Lothar Schäfer
Julie Stenken
Charles Wilkins

Mid-career investigators

Kathryn Curtin (BIOS)
Robyn Goforth (BIOS)
Denise Greathouse
Ralph Henry (BIOS)
T.K.S. Kumar
Michael Lehmann (BIOS)
Matt McIntosh
G. P. Miller (UAMS)
Kevin D. Raney (UAMS)
Joshua Sakon
Wesley Stites
Alan Tackett (UAMS)

Junior investigators

Paul Adams
Yu-Chun Du (BIOS)
Colin Heyes
Daniel Lessner (BIOS)
Nan Zheng

Facilities and directors

- NMR Spectroscopy - James Hinton
- X-ray Crystallography - Joshua Sakon
- Mass Spectrometry - Jackson Lay and Alan Tackett (UAMS)
- Chemical Synthesis - Robert Gawley
- Large Scale Protein Production - Ralph Henry (BIOS)

Rankenberg Defends

Johanna M. Rankenberg successfully defended her doctoral dissertation in cell and molecular biology (CEMB) "Tryptophan Anchored Peptides in Lipid Bilayer Membranes: Control of Peptide Orientation and the Phase Behavior of Cholesterol-Containing Ternary Lipid Mixtures," September 14. Her advisor is **Roger Koeppel**.

Rankenberg received an HBO from *Getuigschrift Hoger Beroepsopleiding* in 2004. She plans to return to The Netherlands for a few months before beginning a postdoc at Kent State University.



Johanna M. Rankenberg

Faculty News

Research News

Gramicidin Channels Find New Applications

“Polar Groups In Membrane Channels: Consequences of Replacing Alanines with Serines in Membrane-Spanning Gramicidin Channels,” **Daily, Anna E., Jung H. Kim, Denise V. Greathouse, Olaf S. Andersen and Roger E. Koeppe II** (2010) *Biochemistry* 49, 6856-6865.

“Amphiphile Regulation of Ion Channel Function By Changes in the Bilayer Spring Constant,” **Lundbæk, Jens A., Roger E. Koeppe II, and Olaf S. Andersen** (2010) *Proc. Natl. Acad. Sci. USA*, 107, 15427-15430.

“Ion Channels as Tools to Monitor Lipid Bilayer–Membrane Protein Interactions: Gramicidin Channels as Molecular Force Transducers,” **Andersen, O. S., C. Nielsen, A. M. Maer, J. A. Lundbæk, M. Goulian and R. E. Koeppe II** (2010) In P. Michael Conn, editor: *Essential Ion Channel Methods*. Academic Press. Burlington. pp. 315-333.

Publications

“Heparin-immobilized Microspheres for the Capture of Cytokines,” **Duo J., Stenken J. A.** *Anal. Bioanal. Chem.* 2010 Sep 9.

Epub ahead of print <http://www.ncbi.nlm.nih.gov/pubmed/20827464>.

“Fe(II)-Catalyzed Amination of Aromatic C-H Bonds via Ring Opening of 2H-Azirines: Synthesis of 2,3-Disubstituted Indoles,” **Samaresh Jana, Mack D. Clements, Barry K. Sharp, and Nan Zheng,** *Organic Letters*.

On the Go

ABI Fall Research Symposium

Little Rock, Sept. 29

Suresh Kumar gave a talk “Molecular Interactions Critical for the Function(s) of the Acidic Fibroblast Growth Factor.”

The following posters were presented: **Matt McIntosh** presented “Synthetic Studies Toward Bioactive Molecules.”

Julie Stenken presented “In Vivo Detection of Peptides and Proteins.”

Roger Koeppe presented “Information from Backbone Signals in Solid-State NMR Spectra of Deuterated Alanines in Oriented Transmembrane Peptides.”

Undergraduate **Omar Salem,** research advisor **Paul Adams,** presented “Characterization of a Switch I mutant of the Ras Protein Cdc42.”

Monitoring Molecules in Neuroscience – 13th International Conference on In Vivo Methods

Brussels, Belgium, Sept. 12-16

Julie Stenken gave a talk “In Vivo Microdialysis Sampling of Cytokines Combined with qRT-PCR Expression Validation.”

CEMB graduate student **Anthony Herbaugh** presented a poster “Development of in Vivo Antibody-Enhanced Microdialysis Collection of CCL2 from Rat Brain.”

Graduate student **Anupama Aggarwal** presented a poster “Microelectrode Array for Dopamine Detection through Redox Cycling. An In Vitro Study.”

Colin Heyes gave an invited talk “Watching Nanoparticles and Biomolecules One Molecule at a Time:

To the Average and Beyond...,” at Northeastern State University Sept. 1.

Heyes will give an invited talk with the same title as above at Arkansas State University Nov. 10.

Joshua Sakon attended the American Society for Bone and Mineral Research in Toronto, Canada, Oct. 14-20.

The following posters were presented with his colleagues from Japan:

“Whole Body Autoradiography of a Fusion Protein [35S]hPTH-CBD in Mice,”

“A Novel Parathyroid Hormone Fusion Protein Causes Sustained Increases in Bone Mineral Density in Ovariectomized Rat After Monthly or Single Dosing,” and

“Prevention of Chemotherapy Induced Alopecia with a Novel Parathyroid Hormone Fusion Protein.”

Ryan Tian attended an NSF panel review in Durham, N.C., Sept. 21-23.

Graduate student **Beth Emerson** attended the 39th annual meeting of the Midwestern Association of Forensic Scientists in Kansas City, Oct. 4-8.

She presented “Analysis of a JWH-018 Metabolite in Urine Samples after Consumption of a ‘Spice’ Herbal Product using Solid Phase Extraction and GC/MS.”

Graduate student **Randy F. Espinal Cabrera** will attend the Lab-on-a-Chip World Congress in San Diego Oct. 28-29.

He will present a poster “Theoretical and Experimental Comparison of Cytokine Pre-Concentration Using Heparin Functionalized Microspheres for Microfluidic Systems Applications: Proof of Principle.”

Safety Tip

Downloading games on to your computer is an invitation for disaster

"Stop. Think. Connect"

October is National Cyber Security Awareness Month an annual effort to increase awareness and prevention of online security problems.

"Stop. Think. Connect." These common sense steps make up this year's theme to raise awareness about cyber security, encouraging users to understand risks, watch for warning signs, and know the right steps to take to safeguard computers.

<http://www.staysafeonline.org>

2010 Arkansas INBRE Research Conference

The department was a cohost with the departments of biological sciences and physics for the 2010 Arkansas INBRE Research Conference Oct. 15-16, in Fayetteville. More than 500 faculty, students and researchers from 24 colleges in Arkansas and surrounding states participated.

This annual conference featured invited faculty talks, student oral presentations, workshops, a poster session and social activities.

More than 150 research posters were presented Saturday. Of the 44 posters presented in the chemistry and biochemistry division, 14 featured department participation. Those with ABI, COBRE or INBRE funding were encouraged to present.

Undergraduate Students

“Ion Transport Study of Titanate Nanwire Membranes”
Victoria Haines*, D. Fologea, G. Salamo, R. Henry, **R. Tian**, R. Williams

“The Conformational and Functional Role of Proline in Human Fibroblast Growth Factor-1,” **Lauren A. Hall***, **Lindsay N. Rutherford**, & **T.K.S. Kumar**

“Quantum Dots-based Breast Cancer Cell Imaging,”
Benjamin Jones*, **Zoraida P. Aguilar**, Hong Xu, John D. Dixon, and Y. Andrew Wang

“Effects of the Heparin Binding Peptide on the Cell Proliferation Activity of the Human Acidic Fibroblast Growth Factor,” **Gayatri Suresh Kumar***, Carmen Padilla, **Anna Daily**, **T.K.S. Kumar** and David McNabb

“Design and Characterization of a Novel Heparin Binding Peptide,” **Rebekah Langston***, **Anna Daily**, Carmen Padilla, David McNabb, **T.K.S. Kumar**

“Design of a Novel S100A13 Monomer in Order to Understand the Non-Classical Release Pathway of FGF-1,”
Ashley Martfeld*, **Anna E. Daily** and **T.K.S. Kumar**

“Probing Denatured State Proteins to Elucidate Folding Energies by Hydrogen Deuterium Exchange Methods,” **Derek Pyland***, **Rohana Liyanage**, **Jackson Lay, Jr.**, **Wesley Stites**

“Ru²⁺ Photocatalyzed [3+2] Cycloaddition of Styrene to N-Cyclopropylaniline,” **Mingzhao Zhu**, **Spencer Shinabery***, and **Nan Zheng**

“Expression, Purification and Characterization of Fibroblast Growth Factor 1 Receptor,” **Daniil Tchakhalian**

“Understanding the Structure and Stability of FGF-1 in a Cellular Environment Using NMR Spectroscopy,”

Daniel Vo* and **Dr. T. K. S. Kumar**

Graduate Students

“Development of Proteomic Methods for the Discovery of Proteins Containing Methionine Sulfoxide,” **Christopher C. Saunders** and **Wesley E. Stites**

“Redox Dependent Disulfide Bonding of VWF A1A2A3 Domains,” **Esra Seyran**, **Rohana Liyanage**, **Jackson O. Lay** and **Wesley Stites**

“Thrombomodulin Methionine Oxidation in Cigarette Smokers,” **Samrat B. Thapa** and **Wesley E. Stites**

A complete list of abstracts and more information available @ <http://chemistry.uark.edu/INBRE/>

Chemistry major **Galen Tobey** was selected among submitted abstracts to present one of six, 15-minute oral presentations. He presented “Methionine Sulfoxide as a Biomarker of Oxidative Stress.” His research advisor is **Wes Stites**.

Ashley Rosenberg, also a chemistry major, won 3rd place in the undergraduate poster competition. She presented “Toward the Synthesis of Antoscomicin B.” Her research advisor is **Matt McIntosh**.



Ashley Rosenberg discusses her research with Dr. Argelia Lorence, ASU

Special Thanks

- Arkansas Union
- Chartwells
- Clever Gifts
- Cosmopolitan Hotel
- Dickson Street Inn
- Eventures Party Rentals
- Facilities Management
- Fayetteville Town Center
- Gerald's
- Homewood Suites by Hilton
- Mailco USA Inc.
- PMC Solutions
- Smith Cabinet Shop, Inc.
- Staybridge Suites
- University of Arkansas Global Campus
- University Relations
- VWR
- Abstracts compiled by **Donna Johnson**, physics department office manager.
- Student volunteers from the ACS SA and all three departments.
- Henderson State University
- Hendrix College
- John Brown University
- Lyon College
- Missouri State University
- Northeastern State University
- Northwest Arkansas Community College
- Ouachita Baptist University
- Pittsburg State University
- Southern Arkansas University
- University of Arkansas at Little Rock
- University of Arkansas for Medical Sciences
- University of Arkansas at Fort Smith
- University of Arkansas at Monticello
- University of Arkansas at Pine Bluff
- University of Central Arkansas
- University of Oklahoma
- University of the Ozarks
- Williams Baptist College

Participating Institutions

- Arkansas State University
- Arkansas Tech University
- Central Baptist College
- Harding University

Calendar of Events

October

- 01..... Application deadline to graduate at the end of fall 2010
 01..... CUME
 04..... Department seminar
 06..... Early Progress grade reports e-mailed for 1000 and 2000 level classes
 11..... Department seminar
 15-16 Arkansas INBRE Research Conference
 18..... Department seminar
 25..... Department seminar
 29..... Last day to drop a full semester class or classes with a mark of "W"
 29..... CUME

November

- 01..... Department seminar
 01-12 Priority registration for spring 2011
 08..... Department seminar
 12..... Incomplete marks from the previous semester changed to failing
 12..... CUME
 15..... Department seminar
 22..... Department seminar
 24..... Fall break, no class, university is open
 25-26 Thanksgiving holiday - university closed
 29..... Department seminar

December

- 03..... CUME
 06..... Department seminar series concludes
 07..... Last day of fall classes
 07..... Last day to officially withdraw from all courses
 08..... Dead day, no classes
 08..... Department holiday potluck
 09-15 Final exams
 24-31 Holiday - university closed

The above dates and events are listed on the department's Blackboard site
<https://learn.uark.edu/>

CUMES

Cumulative exams for graduate students will be given on the following Fridays.

- Fall 2010: Oct. 1, Oct. 29, Nov. 12 and Dec. 3
- Spring 2011: Jan. 21, Feb. 11, Mar. 11, Apr. 1 and Apr. 15

Save the Dates

- **Jan. 24 - Arthur Fry Lecture Series** featuring Donna G. Blackmond, The Scripps Research Institute
- **Oct. 21-22 - 2011 Arkansas INBRE Research Conference** in Fayetteville
Contingent upon the final Razorback football schedule.

October Birthdays

- 01.....Rohana Liyanage
 03.....Nicholas Gleason
 08.....Brian Walker
 09.....Leslie Johnson
 11.....Molly Darragh
 13.....Gwen Mattice
 19.....Mona Dyer
 20.....Zheng Li
 21.....Tomasz Janowski

The publishing of birthdays is not intended to invade the privacy of anyone. If you prefer not to be included, please let us know.

Library Hours

CHBC Library (CHEM 225)
<http://libinfo.uark.edu/chemistry>

Fall hours (August 23 - December 15)
 Sunday2 p.m. to 6 p.m.
 Monday-Thursday.....8 a.m. to 9 p.m.
 Friday8 a.m. to 6 p.m.
 SaturdayCLOSED

The department of chemistry and biochemistry at the University of Arkansas strives for excellence in research, teaching and service in chemistry — the central science.

We aspire to positions of leadership regarding the discovery of new scientific knowledge, the training of students, and the economic development of the State of Arkansas.

We seek to recruit and retain a diverse group of the best faculty, students and staff to address the challenges of the future through interdisciplinary and multidisciplinary research and education.