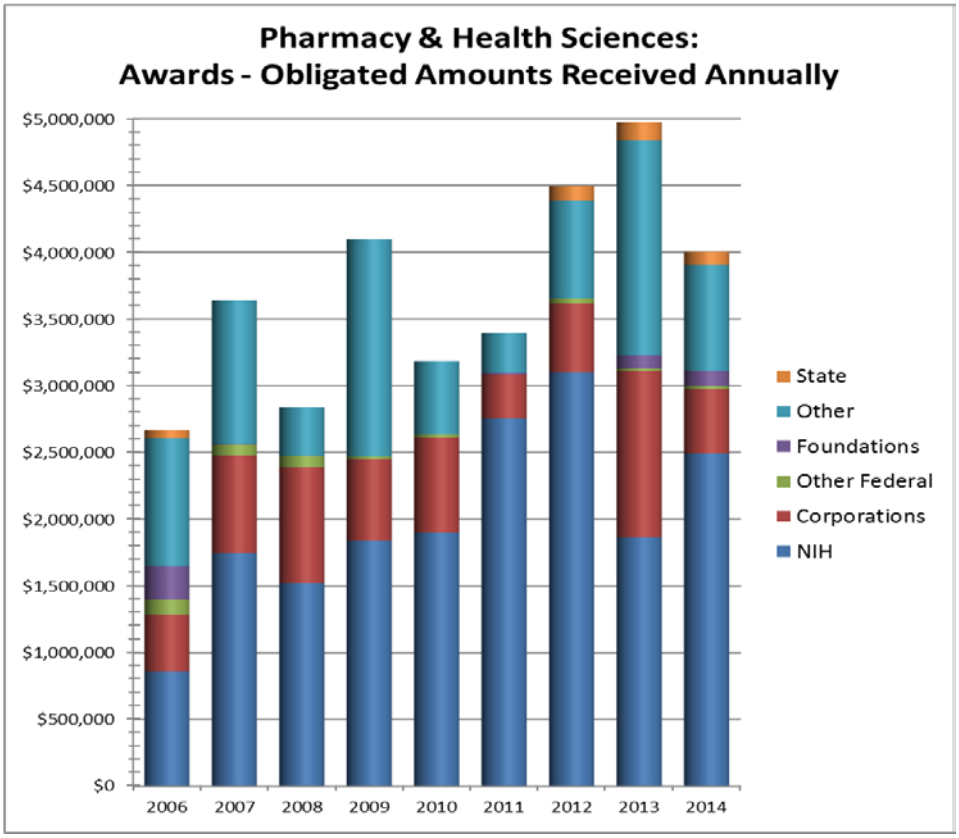
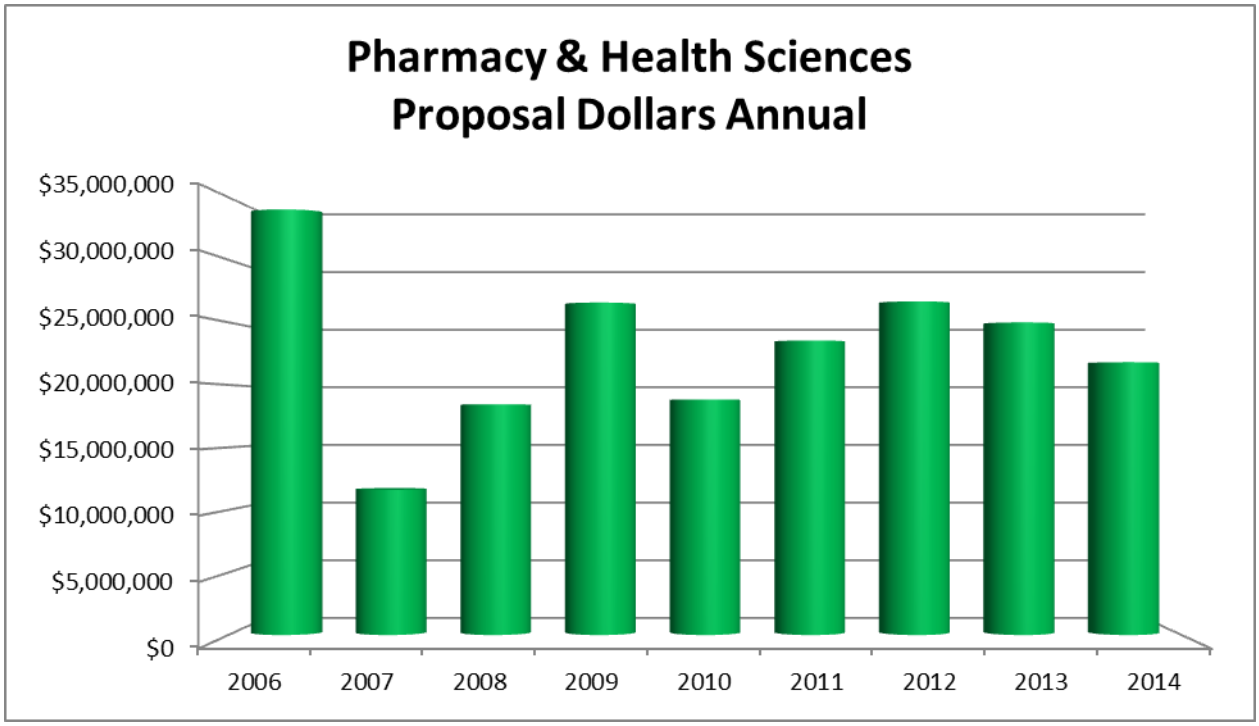
SUBMITTED BY: **STEPHEN M. LANIER, PH.D.**
VICE PRESIDENT FOR RESEARCH
SPECIAL RESEARCH REPORT ON
EUGENE APPLEBAUM COLLEGE OF PHARMACY & HEALTH SCIENCES

RESEARCH AWARDS



Awards Obligated Sponsor Type (Using Prime if Applicable)	2006	2007	2008	2009	2010	2011	2012	2013	2014
State	$60,000						$107,462	$137,139	$100,000
Other	$958,502	$1,077,506	$361,500	$1,625,898	$547,799	$295,367	$735,025	$1,605,742	$793,320
Foundations	$250,000	$4,700				$15,000		$100,000	$113,232
Other Federal	$115,431	$80,582	$83,543	$22,006	$21,879		$35,365	$18,032	$22,259
Corporations	$422,439	$732,224	$870,713	$608,788	$714,854	$327,652	$515,935	$1,246,713	$482,579
NIH	$860,117	$1,745,294	$1,519,818	$1,840,336	$1,899,011	$2,755,304	$3,101,094	$1,865,108	$2,492,557
Grand Total	**$2,666,489**	**$3,640,306**	**$2,835,574**	**$4,097,028**	**$3,183,544**	**$3,393,323**	**$4,494,881**	**$4,972,734**	**$4,003,946**

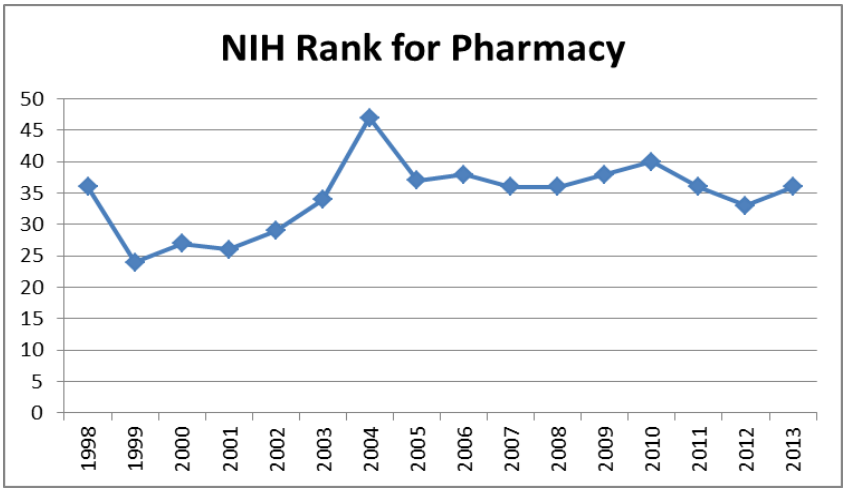
RESEARCH PROPOSALS SUBMITTED



	2006	2007	2008	2009	2010	2011	2012	2013	2014
Proposal Annual Total	$34,026,869	$11,605,975	$18,436,313	$26,581,611	$18,825,673	$23,549,162	$26,675,120	$24,993,872	$21,812,550

EUGENE APPLEBAUM COLLEGE OF PHARMACY & HEALTH SCIENCES RANKINGS

NIH Funding Rank for Pharmacy as Reported by AACP



U.S. News and World Report

According to the U.S. News and World Report's 2015 Best Grad Schools Rankings, Wayne State University's Physician Assistant Studies program is 40th among 190 Physician Assistant programs nationwide. In just two years, Wayne State's program moved up 22 places overall, going from its position as the third best program to the highest ranking program in the state of Michigan.

University	2015 P.A. Studies Ranking	2013 P.A. Studies Ranking
Wayne State University/EACPHS	40	62
Grand Valley State University	57	72
Western Michigan University	57	38
University of Detroit Mercy	81	54
Central Michigan University	Not ranked	94

SAMPLES OF RESEARCH AWARDS TO EACPHS RESEARCHERS

PI: Fei Chen, professor, Department of Pharmaceutical Sciences
Title: MicroRNA-190 and Oxidative Stress in Arsenic Carcinogenesis
Funding Agency: National Institute of Environmental Health Sciences of the NIH
Anticipated Total: $1,708,954
Project Period: 9/1/2012 – 5/31/2017
Project Description: The goal of this project is to determine the role of miR-190 in As3+-induced malignant transformation of the bronchial epithelial cells and the tumorigenesis of the lung. Environmental exposure of arsenic, especially the trivalent form arsenic, has long been a major public health concern. The study will investigate the mechanism of arsenic-induced carcinogenesis by testing the hypothesis that arsenic-induced microRNA-190 is responsible for the malignant transformation and tumorigenesis of the cells. The long-term goals are to understand molecular mechanism of arsenic-induced carcinogenesis and to identify biomarkers for developing early detection, intervention and prevention strategies.

PI: **Aloke Dutta**, professor, Department of Pharmaceutical Sciences
Title: Novel Neuroprotective Treatment for Parkinson's Disease
Funding Agency: National Institute of Neurological Disorders and Stroke of the NIH
Anticipated Total: $2,158,712
Project Period: 9/15/2011 – 6/30/2016
Project Description: Parkinson's disease (PD) is a progressive neurodegenerative disorder characterized by degeneration of the nigrostriatal dopaminergic pathway. It is estimated that PD affects approximately 1-2 % of people older than 65 years of age. The primary therapeutic agent for PD is L-DOPA which improves the symptoms of the disease by producing dopamine in dopamine depleted neurons. However, long term use of L-dopa gives rise to motor fluctuations with dyskinesias and a decrease in duration of response to a given L-dopa dose. Prolonged use of L-dopa also gives rise

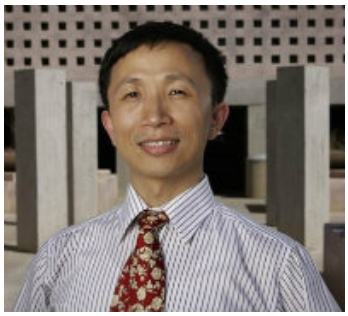
to "on" and "off" episodes and may lead to toxicity to DA neurons and hence, accelerating the DA neurodegeneration process. It is increasingly evident that for a complex disease such as PD, a drug targeting only one target site will only partially address the therapeutic need of the disease. The overall goal in this proposal is to develop multifunctional therapeutic agents which will be useful not only in symptomatic treatment but also could be used as disease-modifying agents by promoting DA neuron survival.

Dr. Dutta also received a grant of over $34,000 from the Michael J. Fox Foundation for Parkinson's Research in December of 2014. The grant is titled, D-512, A Novel Multifunctional D2/D3 Receptor Agonist for the Treatment of PD.

PI: Anna Moszczynska, assistant professor, Department of Pharmaceutical Sciences
Title: Proteasome and Parkin as Drug Targets against Methamphetamine Toxicity
Funding Agency: National Institute on Drug Abuse of the NIH
Anticipated Total: $1,691,000
Project Period: 9/15/2013 – 5/31/2018
Project Description: Methamphetamine (METH) is a highly addictive psychostimulant drug that is neurotoxic when taken at high doses chronically or acutely. METH selectively damages striatal dopaminergic terminals in experimental animals and humans. Despite years of active research on METH neurotoxicity, no specific medications have been developed to counteract the damaging effects that METH has on the brain. Due to its widespread abuse, there is a compelling need for effective pharmaceuticals that can protect and/or restore the brain from the toxic effects of acute METH overdose and chronic METH abuse. Thus, it is necessary to identify molecular drug targets in order to develop novel pharmaceuticals. The long-term goal of this project is to develop neuroprotective therapies to treat the toxic effects of METH use. The goal of the proposed research is to better understand the molecular mechanisms regulating the ubiquitin-proteasome system in the METH-exposed rat brain and to determine whether two components of this system, proteasome and the E3 ligase parkin, are potential pharmaceutical targets that can be used to promote [survival and recovery] of dopaminergic terminals in vivo after toxic doses of [binge and chronic] METH. The proposed research may lead to novel treatments for METH users, but also other brain disorders involving damage to the brain's dopaminergic system such as Parkinson's disease.

PI: Timothy Stemmler, professor, Department of Pharmaceutical Sciences
Title: Structural Insights into the Function of Frataxin
Funding Agency: National Institute of Diabetes & Kidney Diseases of the NIH
Anticipated Total: $1,541,504
Project Period: 9/16/2011 – 7/31/2016
Project Description: Many neurodegenerative disorders show a correlation between iron accumulation in the central nervous system and iron-induced oxidative damage in nerve cells. Alzheimer's, Huntington's, Parkinson's and Friedreich's ataxia are four prevalent neurodegenerative disorders associated with disruption in iron homeostasis, the effect of which leads to the disease state. This proposal is relevant to public

health in that it will provide the molecular and biochemical details of the structure and function of key proteins in the iron regulation pathway that are deficient in patients afflicted with disorders related to improper iron sulfur cluster biosynthesis.



PI: Zhengping Yi, associate professor, Department of Pharmaceutical Sciences
Title: Human Skeletal Muscle Proteome and Phosphoproteome in Obesity and Type 2 Diabetes
Funding Agency: National Institute of Diabetes & Kidney Diseases of the NIH
Anticipated Total: $1,349,133
Project Period: 8/1/2014 – 4/30/2018
Project Description: This project will study the function and regulation of protein phosphatase 2A in the skeletal muscle from lean healthy, obese nondiabetic and type 2 diabetic volunteers, using a combination of clinical, biological, and state-of-the-art proteomic approaches. The findings from the projects proposed in this application may be used to optimize therapeutic and preventative treatment programs, and/or used in the design of drugs targeted at improving metabolic health.

PI: **Christine Davie**, assistant professor, Department of Pharmacy Practice **Title**: Cannabinoid Control of Fear Extinction Neural Circuits in Post-Traumatic Stress Disorder
Funding Agency: National Institute of Mental Health of the NIH
Anticipated Total: $649,165
Project Period: 9/25/14 – 2/28/2018
Project Description: Exposure therapy is a first-line approach in the treatment of post-traumatic stress disorder (*PTSD*) and works by repeated exposure to trauma-related thoughts, feelings, and situations in order to reduce the Distress they cause. Exposure therapy is generally effective, but a significant number of patients have incomplete responses or fail to sustain improvements over time. The goal of the current proposal is to investigate the Cannabinoid System as a potential pharmacological target for improving the Learning that goes on in therapy and perhaps increasing efficacy and durability of exposure therapy in treating *PTSD* (e.g. shortening treatment while strengthening and prolonging gains).

PI: Michael Rybak, professor, Department of Pharmacy Practice
Title: Impact of Daptomycin Dose Exposure on Bilfilm Embedded Enterococci
Funding Agency: National Institute for Allergy and Infectious Diseases of the NIH
Anticipated Total: $380,000
Project Period: 8/1/2014 – 7/31/2016
Project Description: The preservation of available antibiotics to treat multidrug resistant bacterial infections is a vital public health initiative. Medical device infections (MDI) due to biofilm producing vancomycin resistant enterococci are associated with increased mortality and limited treatment options. The overall goal of this project is to determine the optimal dose of daptomycin alone or in combination with other antibiotics for MDI due to enterococci which will allow for better understanding and treatment of this infectious disease.

NEW FACULTY IN THE EUGENE APPLEBAUM COLLEGE OF PHARMACY & HEALTH SCIENCES

Faculty Name	Year Hired	Title	Department	Research Focus
Heather Fritz	2015	Assistant Professor	Health Care Sciences - Occupational Therapy Program	Chronic illness self-management; community participation of older adults
Nora Fritz	2015	Assistant Professor	Health Care Sciences Program - Physical Therapy Program	Neuro-imaging, cognition, and function for people with multiple sclerosis
Brittany R. Stewart, Pharm.D.	2014	Assistant Professor (Clinical)	Pharmacy Practice	Community pharmacy
Kyle J. Burghardt, Pharm.D.	2014	Assistant Professor	Pharmacy Practice	Pharmacogenomics, precision medicine, neuroscience
Vanessa Millisor, Pharm.D.	2014	Assistant Professor (Clinical)	Pharmacy Practice	Oncology pharmacotherapy
Christine Rabinak Davie, Ph.D.	2014	Assistant Professor	Pharmacy Practice	Neuroscience
Arun K. Iyer	2014	Assistant Professor	Pharmaceutical Sciences	Biomaterials, polymer chemistry, drug and gene delivery systems, micro and nanoparticles for targeting and imaging cancer and other diseases
Joseph Roche, Ph.D.	2014	Assistant Professor	Health Care Sciences - Physical Therapy Program	Dysferlin-linked muscular dystrophies and related exercise interventions

Mary Jo Pilat	2014	Assistant Professor	Health Care Sciences - Physician Assistant Studies Program	Oncology trials and patient care
Amber Lanae Smith, Pharm.D.	2013	Assistant Professor (Clinical)	Pharmacy Practice	Pulmonary pharmacotherapy
Zhihui Qin	2013	Assistant Professor	Pharmaceutical Sciences	Novel drugs containing multiple components with distinct mechanisms of action against cancers and brain diseases
Timothy L. Stemmler	2013	Professor	Pharmaceutical Sciences	Iron-sulfur cluster protein dysregulation leading to neurodegenerative disorders including Alzheimer's, Huntington's, Parkinson's, and Friedreich's ataxia
Sujay Galen, Ph.D.	2012	Assistant Professor	Health Care Sciences - Physical Therapy Program	Innovative technologies to measure and promote functional ability
Paul E. Kilgore, M.D., MPH	2011	Associate Professor	Pharmacy Practice	Immunizations and disease prevention (public health)
Olivia M. Merkel	2011	Assistant Professor	Pharmaceutical Sciences	Non-viral siRNA delivery technologies for anti-inflammatory therapy, and particularly the treatment of asthma and cancers
Preethy Samuel	2011	Assistant Professor	Health Care Sciences - Occupational Therapy Program	Family quality of life and its measurement

Christopher D. Giuliano, Pharm.D.	2010	Assistant Professor (Clinical)	Pharmacy Practice	Adult internal medicine pharmacotherapy; scholarship of teaching and learning
Hossam Ashour, Ph.D.	2010	Assistant Professor	Pharmacy Practice	Immunology
Fei Chen	2010	Professor	Pharmaceutical Sciences	Novel genes, stem cells, inhibitory RNAs and epigenetics in environmental cancers
Anna B. Moszczynska	2010	Assistant Professor	Pharmaceutical Sciences	Ubiquitin-protein E3 ligase parkin and dopamine transporters as targets of methamphetamine in brain injury