

Nebraska Tobacco Settlement  
Biomedical Research  
Development Fund

Fiscal Year  
2017-2018

**Progress Report**

University of Nebraska Medical Center  
University of Nebraska-Lincoln  
Creighton University  
Boys Town National Research Hospital

# Nebraska Tobacco Settlement Biomedical Research Development Fund

Fiscal Year 2017-2018

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Biomedical Research  
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**Section I**

**Fund Allocation to Each Institution**

University of Nebraska Medical Center  
University of Nebraska-Lincoln  
Creighton University  
Boys Town National Research Hospital

**University of Nebraska Medical Center  
Nebraska Tobacco Settlement Biomedical Research Development Fund  
FY2018 Allocation**

<b>Strategic Faculty Recruitment and Retention</b>	<b>FY 2017-2018 Allocation</b>
College of Dentistry	\$ 13,943
Ali Nawshad, PhD	
College of Medicine	
Biochemistry/Molecular Biology	\$ 754,632
Surinder Batra, PhD; Steven Caplan, PhD; Rebecca Deegan, PhD*; Punita Dhawan, PhD*; Ricia Hyde, PhD*; Maneesh Jain, PhD; Amar Singh, PhD Moorthy Palanimuthu Ponnusamy, PhD; Armen Petrosyan, PhD	
Cellular/Integrative Physiology	\$ 110,910
Adam Case, PhD; Babu Padanilam, PhD; Steve Sansom, PhD	
Genetics, Cell Biology & Anatomy	\$ 248,254
Vimla Band, PhD*; Kishor Bhakat, PhD; Chittibabu Guda, PhD; Gardi Ghosal, PhD*	
Internal Medicine	\$ 78,832
Sarah Holstein, MD, PhD*	
Pathology/Microbiology	\$ 527,705
Kenneth Bayles, PhD; Leah Cook, PhD*; Scot Ouellette, PhD; Elizabeth Rucks, PhD*; Joshua Santarpi, PhD; Keer Sun, PhD*	
Pharmacology/Experimental Neuroscience	\$ 80,513
Shilpa Buch, PhD*; Howard Fox, MD, PhD; Sidappa Byrareddy, PhD; Sowmaya Yelamanchili, PhD*	
Surgery	\$ 665,618
B Timothy Baxter, MD; Mark Carlson, MD; Iraklis Pipinos, MD; Nora Sarvetnick, PhD*; Sarah Thayer, MD*	
College of Nursing	\$ 114,596
Alyson Hanish, PhD*; Breanna Hetland, PhD*; Jill Reed, PhD*; Sheri Rowland, PhD*	
College of Pharmacy	\$ 329,344
Martin Conda Sheridan, PhD*; Corey Hopkins, PhD; Rongshi Li, PhD; Aaron Mohs, PhD; David Oupicky, PhD	
College of Public Health	\$ 482,446
Fabio Almeida, PhD*; Armando De Alba Romales, PhD*; David Dzewaltowski, PhD; Paul Estabrooks, PhD	
Eppley Institute	\$ 758,720
Hamid Band, MD, PhD; Jennifer Black PhD*; Michael (Tony) Hollingsworth, PhD; Adam Karpf, PhD; Amarnath Natarajan, PhD	
Munroe Meyer Institute	\$ 334,223
Karoly Mirnics, MD, PhD; Shelley Smith, PhD*	
<b>Subtotal</b>	<b>\$ 4,499,736</b>
<b>Research Program &amp; Infrastructure Development</b>	
Comparative Medicine Operations: Bradfield	\$ 226,236
Comparative Medicine Animal Care Cost Support	\$ 250,000
Comparative Medicine Caging & Cabinetry	\$ 175,010
Small Animal Imaging Center MRI Moves and Operatta Imaging	\$ 321,184
FPBCC Freezer Equipment	\$ 126,000
Biosciences Research Training Program (BRTP)	\$ 58,000
IRB & SPAdmin - ITS Svc Level Agreements	\$ 218,171
Research Core Lab Support	\$ 763,777
DRC Research Resource Support	\$ 214,882
Institutional Research Resource Support	\$ 253,519
Center for Cellular Signaling Support	\$ 242,697
Free Radical in Medicine Support	\$ 14,230
Redox Biology Center Support	\$ 5,776
Mentored Scholars Support	\$ 40,118
Great Plains IDeA-CTR Support	\$ 96,819
Central States Center for Agricultural Safety & Health (CS-CASH)	\$ 53,556
<b>Subtotal</b>	<b>\$ 3,059,975</b>
<b>Minority Health Research</b>	
Center for Reducing Health Disparities	\$ 357,483
Health Disparities Pilot Projects	\$ 70,413
Nebraska -Virginia Alliance	\$ 35,538
<b>Subtotal</b>	<b>\$ 463,434</b>
<b>Joint UNMC-UNL Research Programs</b>	
NSF funded Census Research Data Center	\$ 50,000
SEM NOVEL Targeted Treatment of High Risk Atherosclerosis	\$ 20,389
<b>Subtotal</b>	<b>\$ 70,389</b>
<b>Total FY 2017-18 Allocation</b>	<b>\$ 8,093,534</b>

**University of Nebraska-Lincoln**  
**Nebraska Tobacco Settlement Biomedical Research Development Fund**  
**FY 2017-2018 Allocation**

<u>Strategic Faculty Recruitment and Retention</u>	<u>Allocation</u>
Mike Herman, Ph.D., School of Biological Sciences	257,667
Jennifer Auchtung, Ph.D., Food Science and Technology	192,217
Michelle Hughes, Ph.D., Special Education and Communication Disorders	167,000
Tierney Lorenz, Ph.D., Psychology	148,943
Rick Bevins, Ph.D., Psychology	53,667
Ashley Votruba, Ph.D., Psychology	52,227
Amanda Rodriguez, Ph.D., Special Education and Communication Disorders	50,000
Marc Garcia, Ph.D., Sociology	35,767
<b>Subtotal</b>	<b>\$ 957,488</b>

Research Program and Infrastructure Development

Center for Brain, Biology and Behavior Neuroimaging and Salivary Bioscience Research, Cary Savage, Ph.D.	427,938
Redox Biology Center, Don Becker, Ph.D.	109,258
Interdisciplinary Therapeutics Research, David Berkowitz, Ph.D.	100,000
Faculty Development in Biomedical Sciences	87,935
Microbial isocyanide natural products in health and disease, Mark Wilson, Ph.D.	75,000
Systems-driven Personalized Therapeutic Intervention, Tomas Helikar, Ph.D.	75,000
Adherent and invasive E. coli in inflammatory bowel disease: an infection or an inside job, Amanda Ramer-Tait, Ph.D.	75,000
Molecular mechanisms of synergy between the human host and gut commensal Bacteroides species against Candida albicans infection, Wayne Riekhof, Ph.D.	75,000
Cancer Research International Training and Intervention Consortium (CRITIC), Charles Wood, Ph.D.	60,000
Concussion Research, Art Maerlender, Ph.D.	52,665
Multifunctional dressing for treatment of diabetic wounds, Ali Tamayol, Ph.D.	50,000
Multiomics systems approach to assess physiological and metabolic functions of fatty acid transport protein 2 (FATP2), Paul Black, Ph.D.	50,000
Prevention of viral cardiomyopathy and insulinitis by vaccination, Jay Reddy, Ph.D.	50,000
Extracellular vesicles as the vehicles for promoting liver injury induced by HIV and alcohol, Sri Kidambi Ph.D.	50,000
Molecular mechanism of Sestrin2-induced mitophagy under mitochondria-damaging stress, Seung-Hyun Ro, Ph.D.	50,000
Peripheral Nerve Regeneration with Novel Graphene Nerve Guidance Conduit, Yung Yul Lim, Ph.D.	50,000
Developing therapeutic strategies to combat influenza and treat HIV, Daniel Schachtman, Ph.D.	30,000
Carbohydrates and Children, Joel Cramer, Ph.D.	27,500
Demonstrate Efficacy of Low-Intensity-Ultrasound in Improving Microfracture Outcomes, Anu Subramanian, Ph.D.	25,000
Molecular mechanism for phenazine ring modifications during biosynthesis of the redoxactive antibiotics, Liangcheng Du, Ph.D. and Limei Zhang, Ph.D.	25,000
Engineered Fibrin-Assisted Wound Healing, Bill Velander, Ph.D.	13,000
UNL Biomedical and Science Teacher Connector, Judy Diamond, Ph.D.	3,000
<b>Subtotal</b>	<b>\$ 1,561,296</b>

Minority Health Research Grants

Minority Health Disparities Initiative, Dan Hoyt, Ph.D.	25,513
Minority Health Disparities Initiative, Kirk Dombrowski, Ph.D.	148,000
Health Issues in Immigrant Refugee Populations, Trey Andrews, Ph.D.	1,090
Health Issues in Immigrant Refugee Populations, Sergio Wals, Ph.D.	5,000
Creating a Foundation for CBPR with Refugees in Nebraska: Mental Health Pilot Research with Ethnic Community-Based Organizations, Julie Tippens, Ph.D.	473
Interuniversity Collaboration on Minority Health, Bridget Goosby, Ph.D.	5,054
Minority Health Data, Jolene Smyth Ph.D.	5,000
Project Inspire Youth, Lisa Pytlik Zillig Ph.D.	4,725
<b>Subtotal</b>	<b>\$ 194,855</b>

Joint UNL-UNMC Research Programs

From Community to Clinical Trials: Translating Tools and Expanding Partnerships in Preparation for Clinical Trials to Reduce Mental Health Disparities in Underserved Transgender Communities, Deb Hope, Ph.D.	50,000
Development of Ion Channel Blockers for Influenza D Virus, Hideaki Moriyama, Ph.D.	20,000
<b>Subtotal</b>	<b>\$ 70,000</b>

**Total FY 2017-2018 Allocation** **\$ 2,783,639**

**Creighton University**  
**Nebraska Tobacco Settlement Biomedical Research Development Fund**  
**FY2017-2018 Allocation**

<b><u>Strategic Faculty Recruitment and Retention</u></b>	<b><u>Allocation</u></b>
Identifying Genetic Drivers of Complex Human Disease, Holly Stessman, PhD	\$ 91,940
Development of Small Chemical Molecules of Novel TREM-1 Antagonists, Gopal Jadhav, PhD	18,482
Microbial Composition of Cartoid Plaque and Associations with Clinical Outcomes and A Study of Trem-1 and Dendritic Cells in the Pathogenesis of Severe Asthma, Halvor McGee, PhD	58,501
Epigenetic Regulations in Cardiovascular Diseases, Chandra Boosani, PhD	57,400
Analysis of the Budding Yeast Microtubule Organizing Center, Ann Cavanaugh, PhD	69,187
Metabolic Regulation of Salmonella Virulence, Travis Bourret, PhD	35,593
Molecular Mechanisms on Genome Stability, Anna Selmecki, PhD	85,035
Drug Development for Hearing Disorders, Tal Teitz, PhD	1,517
Neurodegeneration, Function, Regeneration and Protection of Sensory Hair Cells in the Inner Ear, Jian Zuo, PhD	18,185
<b>Subtotal</b>	<b>\$ 435,840</b>

<b><u>Research Program and Infrastructure Development</u></b>	
Neuropharmacology Postdoctoral Support, Thomas Murray, PhD	\$ 59,850
Prion Disease Research Support, Jason Bartz, PhD	60,921
Finances First: A Health Intervention for Low-Income Single-Mother Households, Katie Packard, PhD	23,400
Defining Shoulder Injury by Matrisome Disorganization & TREM-Meditated Inflammation, Matthew Dilisio, MD	57,347
Cellular and Molecular Mechanisms of Age-Related Degeneration of Cochlear Hair Cells, David He, PhD	74,659
Identification of HIV-1 Latency-Associated Biomarkers, Michael Belshan, PhD	75,000
Combined Antiretroviral Drug and Monoclonal Antibody Nanoparticle for HIV-1 Prevention, Chris Destache, PharmD	42,590
Biostatistician Core Facility Support, Joseph Knezetic, PhD	73,076
Research Compliance Regulatory Support, Joseph Knezetic, PhD	71,668
School of Medicine Research Faculty Bridge Funding, Robert Dunlay, MD	291,197
Elsevier Pure Master Software Subscription, Beth Herr, MPA	11,390
Mechanisms of Biological Aging of Cochlear Hair Cells, David He, PhD	3,583
Clinical and Translational Science Animal Research, Devendra Agrawal, PhD	112,065
Accelerating Inter-Professional Community-Based Education and Practice Sites, Meghan Potthoff, PhD	1,485
Labvantage Solutions Software System, Henry Lynch, MD	101,470
<b>Subtotal</b>	<b>\$ 1,059,701</b>

<b><u>Minority Health Research Grants</u></b>	
Center for Promoting Health and Health Equality, Sade Kosoko-Lasaki, MD	189,124
<b>Subtotal</b>	<b>\$ 189,124</b>

**Total FY 2017-2018 Allocation** \$ **1,684,665**

# Boys Town National Research Hospital

## Nebraska Tobacco Settlement Biomedical Research Development Fund

Jul 1 2017 - June 2018

### FY 2017-2018 Allocation for period:

	<u>Allocation</u>
<b><u>Strategic Faculty Recruitment and Retention</u></b>	
Sophie Ambrose, PhD, Center for Childhood Deafness	\$ 14,859.84
Monita Chatterjee, Ph.D, Center for Hearing Research	\$ 4,223.85
Shuman He, PhD, Center for Hearing Research	\$ 4,912.53
Lori Leibold, Ph.D., Center for Hearing Research	\$ 5,413.25
Douglas Keefe, Ph.D., Center for Hearing Research	\$ 130,217.03
Edward Walsh, PhD, Center for Hearing Research	\$ 1,643.89
Barbara Morley, PhD, Center for Hearing Research	\$ 17,480.87
Soyoun Cho, Ph.D., Center for Sensory Neuroscience	\$ 75,788.68
Yunxia Lundberg, PhD, Center for Sensory Neuroscience	\$ 101,853.20
Marisa Zallocchi, PhD, Center for Sensory Neuroscience	\$ 254,878.04
Adam Bosen, PhD, Center for Hearing Research	\$ 52,003.06
Karla McGregor, PhD, Center for Childhood Deafness	\$ 22,762.15
Kaylah Lalonde, PhD, Center for Hearing Research	\$ 126,810.58
Katie Gordon, PhD, Center for Childhood Deafness	\$ 36,209.60
Angela AuBuchon, PhD, Center for Hearing Research	\$ 129,227.95
Gabrielle Merchant, PhD, Center for Hearing Research	\$ 31,799.57
<b>Subtotal</b>	<b>\$ 1,010,084.09</b>
<b><u>Research Program and Infrastructure Development</u></b>	
Animal Care Facility Core, JoAnn McGee, PhD	\$ 113,433.30
Electron Microscopy Core, Ryan McCreery, PhD	\$ 2,853.54
Center for Sensory Neuroscience Core Support, Dominic Cosgrove, PhD	\$ 26,327.69
Hearing Research Center Core Support, Lori Leibold, PhD	\$ 87,611.20
Childhood Deafness Center Core Support, Mary Pat Moeller, PhD	\$ 5,134.50
New Projects Fund, Lori Leibold, PhD	\$ 10,121.95
Recruitment Fund, Ryan McCreery, PhD	\$ 12,972.34
Postdoctoral Training, Douglas Keefe, PhD	\$ 6,245.03
<b>Subtotal</b>	<b>\$ 264,699.55</b>
<b><u>Minority Health Research Grants</u></b>	
Minority Recruitment, Mary Pat Moeller, PhD	\$ 31,537.00
Spanish-English Bilinguals, Lori Leibold, PhD	\$ 35,959.36
<b>Subtotal</b>	<b>\$ 67,496.36</b>
<b>Total FY 2017-2018 Allocation</b>	<b>\$ 1,342,280.00</b>

Nebraska Tobacco Settlement  
Biomedical Research  
Development Fund

**Section II**

**Project Progress Descriptions**

University of Nebraska Medical Center  
University of Nebraska-Lincoln  
Creighton University  
Boys Town National Research Hospital



**UNIVERSITY OF NEBRASKA MEDICAL CENTER**  
**Nebraska Tobacco Settlement Biomedical**  
**Research Development Fund (NTSBRDF)**

Year 17: July 1, 2017-June 30, 2018  
Progress Report

**Executive Summary**

UNMC invests NTSBRDF dollars in three areas:

- Recruitment and retention of excellent scientists
- Research infrastructure and program development
- Research and education programs focused on improving health and reducing health disparities

During 2017-18, UNMC received \$8,093,534 in Nebraska Tobacco Settlement Funds that was invested as follows:

- \$4,499,736 in strategic recruitment of new research faculty or retention of meritorious researchers, including \$1,783,244 for the recruitment or retention of women or under-represented minorities.
- \$3,130,388 in program and other infrastructure development, such as capital equipment, new core development, and Centers. This last year there was a particular need to purchase additional equipment as we redistributed faculty into the Fred and Pamela Buffett Cancer Center, including development of a new Bioimaging core.
- \$2,246,678 in recruiting underrepresented minority faculty, research focused on reducing health care disparities, and mentorship and development of trainees and faculty from under-represented minority or other disadvantaged background.

Overall, 27.8% of the total 2017-2018 award focused health disparities research or on the recruitment/retention of under-represented minorities.

Since the activation of the NTSBRDF program at the beginning of fiscal year 2001-02, these funds have been critical to the recruitment and retention of many of our world-class scientists who contribute to our growing research funding portfolio.

Last year UNMC research funding totaled \$135.6 M, which was an increase of 16% in research awards from the previous year, and is the highest level of extramural research funding in the history of UNMC.

Overall, UNMC's total extramural support for research has increased 233% since the availability of the NTSBRDF. The growth of extramural research has a direct and positive impact on the economy of the State of Nebraska because these grants support salaries for faculty and staff and indirectly by providing funds to support purchases.

Since 2001, when NTSBRDF support began, UNMC has invested approximately \$69.2M in the strategic recruitment or retention of 208 researchers, which, in turn, have attracted a total of over \$1.02B in extramural research support after they received NTSBRDF funding. To date, this calculates to a return on investment of approximately 14.8 to 1.

## Strategic Faculty Recruitment & Retention

In 2017-2018, UNMC invested the majority of its NTSBRDF, \$4,499,736 (55.6%), in strategic recruitment and retention of faculty. These NTSBRDF dollars were well invested as the researchers who received them have a combined extramurally funded research portfolio valued at \$149.7M. The funding of these investigators came predominantly from the National Institutes of Health (NIH), including: National Cancer Institute (NCI), National Heart, Lung, Blood Institute (NHLBI), National Institute on Aging (NIA), National Institute of Alcohol Abuse and Alcoholism, National Institute of Allergy & Infectious Diseases (NIAID), National Institute of Biomedical Imaging and Bioengineering (NIBIB), National Institute on Drug Abuse (NIDA), National Institute of Diabetes & Digestive & Kidney Diseases (NIDDK), National Institute of General Medical Sciences (NIGMS), National Institute of Mental Health (NIMH), and the Office of the Director (OD). Other federal funding sources included the United States Army (US Army), the National Science Foundation (NSF), The U.S. Department of Veterans Affairs (VA), and the National Aeronautical and Space Administration (NASA).

### Investigators with first time NTSBRDF support during 2017-2018

**Investigator:** Siddappa N Byrareddy, PhD

**Position Title & Department:** Associate Professor, COM, Pharmacology/Experimental Neuroscience

**Expertise:** Prevention Strategies for Infectious Diseases

**External Funding:**

Current Funding Total: \$6,681,291

Funding sources: DHHS/NIH/NIAID, DHHS/NIH/NIMH

**Investigator:** Punita Dhwan, PhD

**Position Title & Department:** Associate Professor, COM, Biochemistry & Molecular Biology

**Expertise:** Cell-Cell Adhesion in Colorectal Cancer Progression and Metastasis

**External Funding:**

Current Funding Total: \$479,553

Funding sources: DHHS/NIH/NCI, V.A. Medical Center - Omaha

**Investigator:** David Dziewaltowski, PhD

**Position Title & Department:** Professor, COPH, Health Promotion

**Expertise:** Improving Physical Activity & Nutrition of Children, Evidence-based Health Promotion Programs

**External Funding:**

Current Funding Total: \$2,967,487

Funding sources: DHHS/NIH/NCI, Louisiana State University, Iowa State University

**Investigator:** Paul Estabrooks, PhD

**Position Title & Department:** Professor, COPH, Health Promotion

**Expertise:** Health Promotion Programs, Policies, and Practice Interventions

**External Funding:**

Current Funding Total: \$2,274,114

Funding sources: University of Virginia, Omada Health, Patient-Centered Outcomes Research Institute (PCORI)

**Investigator:** Gargi Ghosal, PhD

**Position Title & Department:** Assistant Professor, COM, Genetics, Cell Biology & Anatomy

**Expertise:** Replication Stress Response in Cancer and Premature Aging

**External Funding:**

Current Funding Total: \$401,694

Funding sources: DHHS/NIH/NCI

**Investigator:** Breanna Hetland, PhD

**Position Title & Department:** Assistant Professor, CON, Omaha Division

**Expertise:** Integrative Therapies for the Self-Management of Distressing Symptoms in the Intensive Care Unit

**External Funding:**

Current Funding Total: \$49,412

Funding sources: American Association of Critical-Care Nurses

**Investigator:** Scot Ouellette, PhD

**Position Title & Department:** Associate Professor, COM, Pathology/Microbiology

**Expertise:** Bacterial Cell Division, Gene Regulation and Host-Pathogen Interactions

**External Funding:**

Current Funding Total: \$1,696,500

Funding sources: DHHS/NIH/NIGMS, NSF

**Investigator:** Elizabeth Rucks, PhD

**Position Title & Department:** Associate Professor, COM, Pathology/Microbiology

**Expertise:** Growth & Development of Chlamydia

**External Funding:**

Current Funding Total: \$1,880,776

Funding sources: DHHS/NIH/NIAID

**Investigator:** Joshua Santarpia, PhD

**Position Title & Department:** Associate Professor, COM, Pathology/Microbiology

**Expertise:** Microbial Communities, Bacteriophage for Therapeutic & Industrial Uses

**External Funding:**

Current Funding Total: \$485,138

Funding sources: National Strategic Research Institute

**Investigator:** Amar Singh, PhD

**Position Title & Department:** Associate Professor, COM, Biochemistry and Molecular Biology

**Expertise:** Molecular Mechanisms of Inflammatory Bowel Disease and Colon Cancer, Renal Pathobiology

**External Funding:**

Current Funding Total: \$117,833

Funding sources: V.A. Medical Center - Omaha

**Investigator:** Sowmaya Yelamanchili, PhD

**Position Title & Department:** Assistant Professor, COM, Pharmacology/Experimental Neuroscience

**Expertise:** Role of Regulatory Molecules in Neurological Disorders and Drug Addiction

**External Funding:**

Current Funding Total: \$2,347,527

Funding sources: DHHS/NIH/NIDA

## **Mentored Faculty, New Recruits, and Bridge Funding**

**Investigator:** Fabio Almeida, PhD

**Position Title & Department:** Associate Professor, COPH, Health Promotion

**Expertise:** Health Disparities within Chronic Disease, Health Equity and Improved Health Outcomes

**Investigator:** Leah Cook, PhD

**Position Title & Department:** Assistant Professor, COM, Pathology/Microbiology

**Expertise:** Bone Metastasis, Tumor Immunology and Innate Immunology

**Investigator:** Armando De Alba Rosales, MD, MPH

**Position Title & Department:** Assistant Professor, COPH, Health Promotion

**Expertise:** Disease Control and Prevention, Healthcare Disparities - Policies and Interventions

**Investigator:** Alyson Hanish, PhD

**Position Title & Department:** Instructor, CON, Omaha Division

**Expertise:** Neurobiology of Sleep and Sleep/Wake Disturbances in Vulnerable Pediatric Populations

**Investigator:** Rongshi Li, PhD

**Position Title & Department:** Professor, COP, Pharmaceutical Science

**Expertise:** Drug Discovery, Design, and Development in Anticancer and Antibiotic Therapeutics

**Investigator:** Babu Padanilam, PhD

**Position Title & Department:** Professor, COM, Cellular/Integrative Physiology

**Expertise:** Pathophysiology of Acute Renal Injury

**Investigator:** Jill Reed, PhD, APRN-NP

**Position Title & Department:** Assistant Professor, CON, Kearney Division

**Expertise:** Weight Loss Motivation in Overweight and Obese Adults Living in Rural Areas

**Investigator:** Sheri Rowland, PhD, MSN, APRN-BC, FNP

**Position Title & Department:** Assistant Professor, CON, Lincoln Division

**Expertise:** Physical Activity Behavior, Cardiovascular Risk, and Social and Occupational Influences on Health Behaviors

**Investigator:** Steven C Sansom, PhD

**Position Title & Department:** Professor, COM, Cellular & Integrative Physiology

**Expertise:** Diabetes and Hypertension

**Investigator:** Sarah Thayer, MD

**Position Title & Department:** Professor, COM, Surgical Oncology

**Expertise:** Investigation of Genes that May Contribute to the Initiation, Progression and Regulation of Pancreatic Cancer

## **Investments in Critical Infrastructure Faculty or Strategic Pilot Grants to Incentivize New Research Collaborations**

**Investigator:** Chittibabu Guda, PhD

**Position Title & Department:** Professor, COM, Genetics, Cell Biology & Anatomy, Chief Bioinformatics & Research Computing Officer

**Expertise:** Bioinformatics

**External Funding:**

Current Funding Total: \$238,152

Funding sources: Wichita State University

## **Investigators receiving continuing NTSBRDF support during 2017-2018**

**Investigator:** Hamid Band, MD, PhD

**Position Title & Department:** Professor, Fred & Pamela Buffett Cancer Center

**Expertise:** Cellular Signaling in Cancer, Breast Cancer

**External Funding:**

Current Funding Total: \$1,136,250

Funding sources: U.S. Army

**Investigator:** Vimla Band, PhD

**Position Title & Department:** Chairperson & Professor, COM, Genetics, Cell Biology & Anatomy

**Expertise:** Cancer, Diagnostic/Prognostic Markers for Breast Cancer

**External Funding:**

Current Funding Total: \$50,000

Funding sources: NE DHHS-LB506

**Investigator:** Surinder Batra, PhD

**Position Title & Department:** Chairperson & Professor, COM, Biochemistry & Molecular Biology

**Expertise:** Pancreatic Cancer, Development of Diagnostic/Prognostic Markers for Cancer

**External Funding:**

Current Funding Total: \$14,580,154

Funding sources: DHHS/NIH/NCI, University of Pittsburgh, U.S. Army, NASA Nebraska Space Grant - UNO

**Investigator:** B Timothy Baxter, MD

**Position Title & Department:** Professor, COM, General Surgery

**Expertise:** Aortic Aneurysms, Causes and Treatments for Aneurysms; Surgical Interventions

**External Funding:**

Current Funding Total: \$5,891,010

Funding sources: University of Maryland

**Investigator:** Ken Bayles, PhD

**Position Title & Department:** Associate Vice Chancellor for Basic Science & Professor, COM, Pathology/Microbiology

**Expertise:** Antibiotic Development for Resistant Staphylococcal Disease

**External Funding:**

Current Funding Total: \$11,934,320

Funding sources: DHHS/NIH/NIAID

**Investigator:** Kishor Bhakat, PhD

**Position Title & Department:** Associate Professor, COM, Genetics, Cell Biology & Anatomy

**Expertise:** Epigenetic Diagnostic/Prognostic Biomarkers for Cancer

**External Funding:**

Current Funding Total: \$50,000

Funding sources: NE DHHS - LB506

**Investigator:** Jennifer Black, PhD

**Position Title & Department:** Professor, Fred & Pamela Buffett Cancer Center

**Expertise:** Colon Cancer, Endometrial Cancer, Cellular Signaling

**External Funding:**

Current Funding Total: \$1,632,014

Funding sources: DHHS/NIH/NCI

**Investigator:** Shilpa Buch, PhD

**Position Title & Department:** Professor, COM, Pharmacology/Experimental Neuroscience

**Expertise:** Infectious Diseases of the Brain and their Treatment

**External Funding:**

Current Funding Total: \$20,420,899

Funding sources: DHHS/NIH/NIMH, DHHS/NIH/NIDA

**Investigator:** Steven Caplan, PhD

**Position Title & Department:** Professor, COM, Biochemistry & Molecular Biology

**Expertise:** Molecular Basis of Cancer, Cellular Imaging

**External Funding:**

Current Funding Total: \$1,272,034

Funding sources: DHHS/NIH/NIGMS

**Investigator:** Mark A Carlson, MD

**Position Title & Department:** Professor, COM, General Surgery

**Expertise:** Surgical Devices and Advanced Surgical Technology, Remote Trauma Care

**External Funding:**

Current Funding Total: \$1,776,003

Funding sources: DHHS/NIH/NCI, Otis Glebe Medical Research Foundation - NU Foundation

**Investigator:** Adam Case, PhD

**Position Title & Department:** Assistant Professor, COM, Cellular & Integrative Physiology

**Expertise:** Role of Redox Signaling and Immune Function in Hypertension

**External Funding:**

Current Funding Total: \$764,997  
Funding sources: DHHS/NIH/NHLBI

**Investigator:** Martin Conda Sheridan, PhD

**Position Title & Department:** Assistant Professor, COP, Pharmaceutical Science

**Expertise:** Design and Delivery of Nanodrugs for the Treatment of Cancer and Infectious Diseases

**External Funding:**

Current Funding Total: \$417,000  
Funding sources: American Chemical Society, U.S. Army

**Investigator:** Howard Fox, MD, PhD

**Position Title & Department:** Senior Associate Dean for Research & Professor, COM, Pharmacology/Experimental Neuroscience

**Expertise:** Infectious and Neurodegenerative Diseases and Substance Abuse

**External Funding:**

Current Funding Total: \$13,128,675  
Funding sources: DHHS/NIH/NIMH, DHHS/NIH/NIDA

**Investigator:** Michael (Tony) Hollingsworth, PhD

**Position Title & Department:** Professor, Fred & Pamela Buffett Cancer Center

**Expertise:** Pancreatic Cancer

**External Funding:**

Current Funding Total: \$20,666,734  
Funding sources: DHHS/NIH/NCI

**Investigator:** Sarah Holstein, MD, PhD

**Position Title & Department:** Associate Professor, COM, Internal Medicine Oncology/Hematology

**Expertise:** Novel Therapeutic Agents for the Treatment of Multiple Myeloma

**External Funding:**

Current Funding Total: \$1,192,796  
Funding sources: Celgene Corporation, Janssen R&D, LLC, NE DHHS - LB506, AbbVie, Inc.

**Investigator:** Corey Hopkins, PhD

**Position Title & Department:** Associate Professor, COP, Pharmaceutical Science

**Expertise:** Drug Discovery with an Emphasis on Mosquito Controls to Prevent the Transmission of Malaria, West Nile Virus, Dengue, Yellow Fever, and Zika

**External Funding:**

Current Funding Total: \$1,900,782  
Funding sources: Vanderbilt University, DHHS/NIH/NIDDK, DHHS/NIH/NIDA, Ohio State University

**Investigator:** Ricia K Hyde, PhD

**Position Title & Department:** Assistant Professor, COM, Biochemistry & Molecular Biology

**Expertise:** Regulation of Gene Expression in Leukemia and Normal Hematopoiesis

**External Funding:**

Current Funding Total: \$200,000  
Funding sources: St. Baldrick's Foundation, Leukemia Research Foundation

**Investigator:** Maneesh Jain, PhD

**Position Title & Department:** Associate Professor, COM, Biochemistry & Molecular Biology

**Expertise:** Diagnostics and Therapeutics Against Cancer and Allied Diseases

**External Funding:**

Current Funding Total: \$724,497  
Funding sources: Iowa State University, Sanguine Diagnostics And Therapeutics, Inc.

**Investigator:** Adam Karpf, PhD

**Position Title & Department:** Associate Professor, Fred & Pamela Buffett Cancer Center

**Expertise:** DNA Methylation Changes in Ovarian Cancer

**External Funding:**

Current Funding Total: \$30,000

Funding sources: Marsha Rivkin Center for Ovarian Cancer Research

**Investigator:** Karoly Mirnics, MD, PhD

**Position Title & Department:** Director & Professor, MMI, Psychiatry

**Expertise:** Molecular Neurobiology of Brain Diseases

**External Funding:**

Current Funding Total: \$3,352,004

Funding sources: DHHS/NIH/NIMH

**Investigator:** Aaron Mohs, PhD

**Position Title & Department:** Associate Professor, COP, Pharmaceutical Science

**Expertise:** Development of Fluorescent Imaging Contrast Agents to Guide Surgical Removal of Tumors, Drug Delivery Systems that Target Tumor Metabolism, and Pathogen Biosensing

**External Funding:**

Current Funding Total: \$1,873,846

Funding sources: DHHS/NIH/NIBIB, DHHS/NIH/NCI

**Investigator:** Amarnath Natarajan, PhD

**Position Title & Department:** Professor, Fred & Pamela Buffett Cancer Center

**Expertise:** Small Molecule Probes, Cancer Therapeutics

**External Funding:**

Current Funding Total: \$1,732,022

Funding sources: DHHS/NIH/NCI

**Investigator:** Ali Nawshad, PhD

**Position Title & Department:** Associate Professor, COD, Oral Biology

**Expertise:** Cellular Signaling During Palate Development

**External Funding:**

Current Funding Total: \$260,431

Funding sources: Texas A&M University, University of Michigan

**Investigator:** Rebecca Deegan, PhD

**Position Title & Department:** Assistant Professor, COM, Biochemistry and Molecular Biology

**Expertise:** Antioxidant & Free Radical Protection during Radiation Therapy

**External Funding:**

Current Funding Total: \$2,193,280

Funding sources: DHHS/NIH/NCI, DHHS/NIH/Office of the Director

**Investigator:** David Oupicky, PhD

**Position Title & Department:** Parke-Davis Professor, COP, Pharmaceutical Sciences, and Co-Director, Center for Drug Delivery & Nanomedicine

**Expertise:** Polymers & Nanoparticles for Delivery of Drugs & Genes

**External Funding:**

Current Funding Total: \$3,426,062

Funding sources: DHHS/NIH/NIBIB, DHHS/NIH/NIDDK

**Investigator:** Moorthy Palanimuthu Ponnusamy, PhD

**Position Title & Department:** Assistant Professor, COM, Biochemistry & Molecular Biology

**Expertise:** Biochemical & Molecular Studies of MUC4 in Ovarian Cancer

**External Funding:**

Current Funding Total: \$1,869,115

Funding sources: DHHS/NIH/NCI

**Investigator:** Armen Petrosyan, PhD

**Position Title & Department:** Assistant Professor, COM, Biochemistry and Molecular Biology

**Expertise:** Prostate Cancer

**External Funding:**

Current Funding Total: \$544,476  
Funding sources: DHHS/NIH/NIAAA

**Investigator:** Iraklis Pipinos, MD

**Position Title & Department:** Professor, COM, General Surgery

**Expertise:** Regenerative Medicine, Peripheral Arterial Disease, Repair of Skeletal Muscle Tissue in the Extremities

**External Funding:**

Current Funding Total: \$5,046,071  
Funding sources: DHHS/NIH/NIA, University of Nebraska - Omaha, University of Pittsburgh

**Investigator:** Nora Sarvetnick, PhD

**Position Title & Department:** Director, Nebraska Regenerative Medicine Project & Professor, COM, General Surgery

**Expertise:** Regenerative Medicine, Regulation of the Immune Response, Immunological Implications of Diabetes, Immunology of Autoimmune Diseases

**External Funding:**

Current Funding Total: \$4,423,276  
Funding sources: University of Nebraska Foundation, Juvenile Diabetes Research Foundation International, DHHS/NIH/NIAID, Helmsley Charitable Trust, Cincinnati Children's Hospital Medical Center

**Investigator:** Shelley Smith, PhD

**Position Title & Department:** Professor, MMI, Neurodevelopmental Neuroscience

**Expertise:** Genetic Mutations Influencing Developmental Disorders, Language Disorders, Dyslexia

**External Funding:**

Current Funding Total: \$5,340,553  
Funding sources: DHHS/NIH/NIGMS, University of Kansas

**Investigator:** Keer Sun, PhD

**Position Title & Department:** Assistant Professor, COM, Pathology/Microbiology

**Expertise:** Immunology, Virus-Host-Bacterium Interactions

**External Funding:**

Current Funding Total: \$2,258,626  
Funding sources: DHHS/NIH/NHLBI, DHHS/NIH/NIAID

## **Research Program and Infrastructure Development**

A total of \$3,130,388 (38.7%) was invested in research program and infrastructure development in 2017-2018. Additionally, \$70,389 was spent on pilot grants to spur joint research programs between University of Nebraska Lincoln and University of Nebraska Medical Center faculty. Infrastructure support included the general areas of animal facilities support, research core laboratories, grant management, and educational/training & compliance programs for NIH-funded scientists. Research infrastructure is critical to attract and retain nationally recognized scientists. These investments in research infrastructure have direct benefit to investigators with research awards that totaled over \$135.6M in fiscal year 2018.

Examples of infrastructure supported by these funds include support of the Comparative Medicine department (which was awarded \$651,246 or 20.8% of the infrastructure total) for animal facility equipment and program development that benefits many researchers. Additional investments were made for translational core facilities such as the development of a Bioimaging Core that provides cutting edge imaging technology critical to the study of traumatic brain injuries and neurodegenerative diseases such as Parkinson's and Alzheimer's. These cores are essential for the success of our NIH funded Centers such as the Nebraska Center for Nanomedicine, the Center for Neurodegenerative



Disorders, and the Center for Integrative & Translational Neuroscience. They also provide services to investigators across the region.

NTSBRDF supports new software development and implementation to facilitate access of our scientists to management, informatics, educational, and other software applications to increase research efficiency and decrease the risk of non-compliance.

Joint programs between UNL and UNMC included funding for the following projects; “SEM NOVEL Targeted Treatment of High Risk Atherosclerosis” and “Census Research Data Center”.

### **Minority Health and Health Disparities Research and Mentor Programs**

In 2017-18, UNMC invested \$463,434 in health disparities by supporting UNMC’s Center for Reducing Health Disparities (CRHD), investing in pilot projects for health disparities research, supporting collaborations with the Virginia-Nebraska Alliance and the recruitment of diversity students for the Summer Undergraduate Research Program (SURP) from disadvantaged backgrounds.

The Center for Reducing Health Disparities (CRHD) at the UNMC College of Public Health is focused on maintaining close partnerships with underserved communities, especially low-income, minority communities, and other stakeholders throughout Nebraska to identify, prioritize and then develop and implement evidence-based health promotion programs and to conduct health disparities research. NTSBRDF supported in part faculty and staff at the center who received 10 new grants and contracts, completed 14 research projects, and published 30 peer-reviewed publications and 5 community health reports. They also gave 32 presentations at federal or regional conferences, offered two courses to students at the university, and advised or trained 375 students on community engagement, advocacy, and the provision of health services to promote health equity. It is estimated that during 2017 the CRHD team served about 65,000 local residents through hosting or organizing 23 health promotion programs, 4 health fairs, and 1 radio program. The CRHD Annual Report gives more details about the research and activities of the Center:

<https://www.unmc.edu/publichealth/crhd/about/2017-chrd-annual-report.pdf>. An investment of \$357,483 was made in the Center for Reducing Health Disparities.

Health disparities research Pilot Projects focused on Rural Breast Cancer Survivors and Vitamin A in Maternal Child Health.

**Project Title:** Increasing rural women’s access to early psychosocial care at breast cancer diagnosis using the CaringGuidance™ internet-based program

**Principal Investigator:** Robin Lally, PhD, Professor, College of Nursing

It is well established that underserved populations, both minority and rural, have lower access to breast cancer care and follow up. Minority populations living in rural communities experience even higher health disparities. This program is intended to increase access to breast cancer care among rural women. The low cost CaringGuidance™ tool has the potential to improve health disparities for all women. Pilot data from this project will evaluate its efficacy for use in a larger population for future studies.

**Project Title:** Vitamin A in Maternal-Child Health: The VitMatCH project

**Principal Investigator:** Corrine Hanson, PhD, Associate Professor, College of Allied Health Professions

Vitamin A deficiency during pregnancy has been associated with adverse pregnancy outcomes and is most common in minority populations, the same populations that experience higher adverse pregnancy outcomes. The association between Vitamin A deficiency and adverse outcomes has not been well established in developed nations, like the US. Even if associated, it is unknown whether vitamin A deficiency is the cause of those outcomes. This study is intended to identify the frequency of vitamin A deficiency in a racially diverse cohort of pregnant women, and evaluate its association with pregnancy outcomes, including, respiratory distress syndrome in the newborn.

An investment of \$70,413 was made in health disparities research Pilot Projects.

The Virginia-Nebraska Alliance (The Alliance) is a unique partnership between unlikely partners to address the national need to diversify the healthcare and biomedical research workforce. The Alliance was formed in September 2004 between two of Virginia's Historically Black Colleges/ Universities (HBCUs)—J. Sargeant Reynolds Community College and Virginia Commonwealth University (VCU)—and UNMC. In 2006 the University of Richmond (U of R), the University of Virginia (UVA), and Eastern Virginia Medical School (EVMS) joined so the Alliance now includes five HBCUs. The Alliance focuses on four areas: 1) student exchanges to identify and encourage undergraduate students interested in health professions or health research graduate education to pursue their goal and consider attending programs at UNMC; 2) faculty exchanges; 3) faculty research collaborations; and 4) institutional collaborations to pursue new funding opportunities. Participating students conduct research with mentors for two summers. Faculty exchanges include collaborative research, seminars and presentations. Virginia HBCUs attract a majority of underrepresented minority students and provide a pipeline to graduate training programs as they are largely focused on undergraduate education. UNMC, in turn, views the relationship as an opportunity to attract more diverse students into its health professions and graduate education programs. Students become members of actively funded UNMC research teams for 10 weeks each summer during which they develop technical laboratory skills, expand their scientific knowledge base, analyze data, document results, participate in team meetings, attend research weekly seminars, and then present their work at the end of summer research poster session with all the other summer undergraduate students. They learn about career paths, interviewing skills, balancing the stresses of graduate training and personal life, and visit with successful role models. This year there were 43 Virginia HBCU applicants with three students from Virginia Union University hosted at UNMC laboratories as part of the Summer Undergraduate Research Program (SURP) for Students from Disadvantaged Backgrounds. A total of \$35,538 was invested in this program.

**UNIVERSITY OF NEBRASKA-LINCOLN**  
**Nebraska Tobacco Settlement Biomedical**  
**Research Development Fund (NTSBRDF)**

Year 17: July 1, 2017–June 30, 2018  
Progress Report

**Executive Summary**

UNL's goal for the NTSBRDF program is to leverage this investment to increase our biomedical research capacity in terms of human resources, cutting-edge research equipment and external research funding. In the 17 years of NTSBRDF funding, UNL's biomedical research capacity has grown continually to address the needs of the state of Nebraska and the nation. This has enabled UNL researchers to contribute knowledge and technical advancements required to prevent, diagnose and treat disease. This ultimately leads to the improved health of Nebraskans and stimulates economic development and employment opportunities in the state.

UNL has invested the NTSBRDF funds in four main areas:

- **Strategic Faculty Recruitment and Retention:** UNL has selected a group of faculty whose research aligns closely with our strategic priorities in health prevention and treatment. These faculty either transfer strong externally funded research programs to UNL or have a high potential for achieving rapid research success as evidenced by the acquisition of new funding. This investment in human resources is a highly effective means of increasing our biomedical research capacity and often provides the most immediate return.
- **Research Program and Infrastructure Development:** UNL has employed the NTSBRDF funds to strengthen existing research programs to increase their competitiveness for external awards that support major interdisciplinary research programs aligned with UNL's research priorities in biomedicine.
- **Minority Health Research Grants:** These research investments specifically address issues of importance to the health of Nebraska's minority populations.
- **Joint UNL-UNMC Research Programs:** These programs bring UNL and University of Nebraska Medical Center faculty together to collaboratively address biomedical research problems to which each institutional partner contributes unique expertise, addressing complex research problems in ways that would not be otherwise possible.

**In 2017-2018, UNL invested a total of \$2,783,639** from the NTSBRDF, including an allocation of \$957,488 for seven new faculty hires; \$1,561,296 to support research programs and infrastructure development; \$194,855 (7 percent total) for grants to researchers addressing minority health disparities in Nebraska; and \$70,000 for two joint UNL/UNMC research projects.

As has been the case in previous years, this investment has made a great impact on UNL's research climate and productivity. These investments resulted in a total of \$44,877,498 in external funding in 2017-2018. This is an impressive return on investment and speaks to the value of the investment UNL has made in building biomedical research excellence.

## Strategic Faculty Recruitment and Retention

**Introduction:** In 2017-2018, UNL invested \$957,488 of NTSBRDF funds to expand faculty expertise into new areas of biomedical research that have a strong likelihood of increasing our base of externally funded research programs of interest to the National Institutes of Health and other federal agencies (e.g., Centers for Disease Control and United States Agency for International Development) and private agencies (e.g., American Heart Association and American Cancer Society). These funds also made it possible to hire seven new faculty members. These individuals range from a full professor who will lead the School of Biological Sciences to assistant professors with novel expertise in the gut microbiome and antibiotic resistance; audiology and vestibular science; psychology; and racial and ethnic health disparities. The investments in new faculty hires and retentions has resulted in the transfer or acquisition of new research awards totaling \$23,642,847.

**Investigator:** Mike Herman, Ph.D.

**Position Title & Department:** Professor, School of Biological Sciences

**Expertise:** Evolutionary and Ecological Genomics

**External Funding:** No external funding active or pending at this time.

**Investigator:** Jennifer Auchtung, Ph.D.

**Position Title & Department:** Assistant Professor, Department of Food Science and Technology

**Expertise:** Understanding how the gut microbiome affects human health and how antibiotics disrupt microbiome-mediated resistance to colonization by antibiotic-resistant pathogens; development of new microbiome-targeted therapies to treat diseases

**External Funding:**

**Active:** \$450,422

**Proposals Pending:** \$89,994

**Funding Sources:** NIH, Baylor College of Medicine, U.S. Department of Agriculture

**Investigator:** Michelle Hughes, Ph.D.

**Position Title & Department:** Associate Professor, Department of Special Education and Communication Disorders

**Expertise:** Audiology and cochlear implant research

**External Funding:**

**Active:** \$276,988

**Proposals Pending:** \$341,424

**Funding Sources:** NIH

**Investigator:** Tierney Lorenz

**Position Title & Department:** Assistant Professor, Department of Psychology and Center for Brain, Biology and Behavior

**Expertise:** Interactions between women's mental, physical and sexual health

**External Funding:**

**Active:** \$36,874

**Proposals Pending:** \$31,000

**Funding Sources:** NIH, National Organization for Rare Disorders

**Investigator:** Ashley Votruba, Ph.D.

**Position Title & Department:** Assistant Professor, Department of Psychology

**Expertise:** Understanding how cognitive biases and culture influence policy and legal decision-making in tort law, criminal law and family law

**External Funding:**

**Active:** \$13,898

**Proposals Pending:** None

**Funding Sources:** Department of Defense

**Investigator:** Amanda Rodriguez, Ph.D.

**Position Title & Department:** Assistant Professor, Department of Special Education and Communication Disorders

**Expertise:** Vestibular science and balance research

**External Funding:** No external funding active or pending at this time.

**Investigator:** Marc Garcia, Ph.D.

**Position Title & Department:** Assistant Professor, Department of Sociology

**Expertise:** Racial and ethnic health disparities across the life course

**External Funding:** No external funding active or pending at this time.

## **Research Program and Infrastructure Development**

**Introduction:** In 2017-2018, a total of \$1,561,296 was invested in research program and infrastructure development to support UNL faculty in their competitiveness for external funding for biomedical research. These investments have leveraged \$33,577,066 in new external funding in 2017-2018. Areas of investment include the development and support of novel research programs with the potential to improve human health and enhance UNL infrastructure to conduct biomedical research in general. The projects are broadly focused on cellular biology, chemistry and biochemistry; neuroscience, brain biology and behavior, and cognition; tissue engineering; wound healing; virology, microbiology and immunology; discovery and development of new bioactive agents for the prevention, treatment and diagnosis of disease, injury or ailment; nutrition and metabolism in children; connecting biomedical scientists to science educators in the public school system; and the equipment required to conduct this research. Some projects are collaborations with investigators at other NU system institutions and provide evidence of our commitment to leverage the human and other Nebraska resources to conduct cutting-edge biomedical research that requires highly skilled interdisciplinary teams.

**Project Title:** Center for Brain, Biology and Behavior Neuroimaging and Salivary Bioscience Research

**Principal Investigator:** Cary Savage, Ph.D.

**Description:** The Center for Brain, Biology and Behavior (CB3) is an interdisciplinary research center established to investigate the social, biological, behavioral, engineering and neurological issues related to human performance and development. Investments were made to support center leadership to further research in these areas.

**Project Title:** Redox Biology Center

**Principal Investigator:** Don Becker, Ph.D.

**Description:** Bridge funding for the center to continue to promote interdisciplinary and multi-institution collaborations that address novel questions in redox biology and impact human health and disease (e.g., pathogenesis and stress response, redox signaling, mitochondrial dysfunction and metal ion homeostasis). Bridge funding will be for technical support of RBC research core facilities in spectroscopy, bioimaging, metabolomics and proteomics as well as

partially support maintenance/service contracts for instrumentation in these research core facilities. A new MicroScale Thermophoresis instrument was purchased and will provide faculty with capabilities to analyze the affinity interactions between biomolecules (proteins and polynucleotides) and small molecules to understand critical biochemical processes for metabolic engineering or pathogenesis pathways to control pathogens or discover new drugs to treat diseases.

**Project Title:** Interdisciplinary Therapeutics Research

**Principal Investigator:** David Berkowitz, Ph.D.

**Description:** Funding will support the promotion of therapeutic discovery and research and development opportunities for faculty across the UNL campus. Specific efforts are directed developing new bioactive agents for the prevention, treatment and diagnosis of disease, injury or ailment (e.g., pharmaceuticals, vaccines, prophylaxes and therapeutics).

**Project Title:** Microbial Isocyanide Natural Products in Health and Disease

**Principal Investigator:** Mark Wilson, Ph.D.

**Description:** The efficacy of current antibiotics is rapidly decreasing with the emergence of antibiotic-resistant microbes. The objective of this work is to determine the biosynthetic pathways and mechanism(s) of action of antimicrobial isocyanide natural products that possess broad antimicrobial activities. Preliminary data will be generated to: 1) Identify the long-sought molecular targets of the isocyanide antibiotic xanthocillin; 2) Identify and characterize key proteins involved in the biosynthesis of isocyanide antibiotics; and 3) Characterize the effect of isocyanides on microbial intracellular redox state.

**Project Title:** Systems-driven Personalized Therapeutic Intervention

**Principal Investigator:** Tomas Helikar, Ph.D.

**Description:** A systems-based, multi-scale computational model will be developed to predict and experimentally validate (in vitro/in vivo) combinatorial therapeutic (drug and vaccine) interventions against influenza infection. The transformational potential of this project lies in a thorough understanding of the virus-host interactions and system-wide dynamics during influenza virus infection at the molecular and cellular scales of biological organization, which is essential to develop novel therapeutic options that consider both the virus and the host. This model will also be personalized through iterative improvements that incorporate individualized (or sub-population) information.

**Project Title:** Adherent and invasive E. coli in inflammatory bowel disease: an infection or an inside job

**Principal Investigator:** Amanda Ramer-Tait, Ph.D.

**Description:** Inflammatory bowel disease is associated with an altered gut microbiota composition. The adherent and invasive Escherichia coli bacteria, known as AIEC, appear to expand during inflammation and are observed in the ileal mucosa in subsets of Crohn's disease patients. The research team will phenotype a genetically diverse strain collection using both in vitro assays and an animal model. Next, researchers will implement a systematic genetic analysis to associate AIEC phenotypes with genomic events that may underlie the inflammation-inducing phenotypes. Upon completion, studies will 1) Define the important genes and pathways that lead to inflammation-inducing AIEC phenotypes, and 2) Determine how in vitro phenotypes predict inflammatory potential in an animal model.

**Project Title:** Molecular mechanisms of synergy between the human host and gut commensal Bacteroides species against Candida albicans infection

**Principal Investigator:** Wayne Riekhof, Ph.D.

**Description:** Microbes form complex and dynamic communities that interact with each other and with host organisms in myriad ways with profound impacts on health and disease of the host. Researchers will define the molecular mechanisms by which the human commensal

bacterium, *Bacteroides thetaiotaomicron* (B. theta), amplifies the host innate immune response against infection by the pathogenic yeast, *Candida albicans*. The proposed project is interdisciplinary and will use genetics, biochemistry and molecular biology approaches to understand interkingdom interactions using a novel host-interaction response screening platform.

**Project Title:** Cancer Research International Training and Intervention Consortium (CRITIC)

**Principal Investigator:** Charles Woods, Ph.D.

**Description:** Funding will provide partial support for the fourth annual consortia meeting on HIV-associated malignancies to be held March 27-29, 2019, in Dar es Salaam, Tanzania. The University of Nebraska-Lincoln will host the meeting in partnership with Ocean Road Cancer Institute. The meeting will provide an opportunity for consortia members to present their research findings from individual research projects; report on collaborative HIV-associated malignancy pilot projects; facilitate collaborations between investigators from the U.S., sub-Saharan African and South America through personal interactions at the meeting; conduct an interactive workshop to develop research skills and refine concepts for short-term, hypothesis-driven research proposals; and develop a plan to sustain the consortia in the future.

**Project Title:** Concussion Research

**Principal Investigator:** Art Maerlender, Ph.D.

**Description:** Support for concussion research and neuropsychological cases

**Project Title:** Multifunctional dressing for treatment of diabetic wounds

**Principal Investigator:** Ali Tamayol, Ph.D.

**Description:** The project's aim is to develop a multifunctional dressing that transdermally delivers oxygen and angiogenic factor to a wound bed as well as prevents infection in diabetic wounds. This platform consists of microneedle arrays that bypass the non-viable covering and delivers vascular endothelial growth factor, or VEGF, and oxygen to the wound bed. The microneedles contain calcium peroxide that releases oxygen to enhance the ability of immune cells to fight pathogens and promotes cellular growth. The microneedles also carry VEGF in a hydrogel that provides slow release of VEGF over three days to enhance vascularization and tissue growth.

**Project Title:** Multiomics systems approach to assess physiological and metabolic functions of fatty acid transport protein 2 (FATP2)

**Principal Investigator:** Paul Black, Ph.D.

**Description:** This Biomedical Research Seed Grant is required to generate key preliminary data demonstrating FATP2 functions in the import of fatty acids and that blocking this process through genetic deletion can prevent toxic processes leading to cell death through reduced lipid accumulation, membrane remodeling and generation of oxidized lipids. As cellular functions, including lipid metabolism, are governed by the integration of complex and dynamic information networks, the team's planned approach to understand the impact of loss of FATP2 function in response to dietary fat and fasting by integrating results of high-dimensional transcriptomic, proteomic, and metabolomic data is innovative, timely and will provide a rigorous test of FATP2 function necessary to understand its role in health and disease.

**Project Title:** Prevention of viral cardiomyopathy and insulinitis by vaccination

**Principal Investigator:** Jay Reddy, Ph.D.

**Description:** Enteroviruses are the most common cause of infections in humans worldwide. Different serotypes of Coxsackievirus group B (CVB) can cause different diseases. For example, CVB3 can induce inflammatory heart disease (myocarditis) and CVB4 infection is an important trigger of insulinitis/type I diabetes. Researchers generated one vaccine virus that can protect against both CVB3 and CVB4 serotypes. The research team will ask the following questions: Can a single CVB3 vaccine virus protect against both myocarditis and insulinitis, and

is this vaccine safe? The team will determine the efficacies of protection induced by attenuated and inactivated vaccines and test for autoimmunity in challenge studies with the wild type virus.

**Project Title:** Extracellular vesicles as the vehicles for promoting liver injury induced by HIV and alcohol

**Principal Investigator:** Sri Kidambi, Ph.D.

**Description:** The research team's objective is to uncover significant mechanisms causing liver injury induced by HIV and alcohol. The following specific aims are proposed: 1) Examine potentiating effects of alcohol on HIV-induced hepatocyte death and the role of large extracellular vesicles (i.e., apoptotic bodies) in promoting liver inflammation by macrophages; 2) Determine how alcohol accelerates HIV-induced exosome release from hepatocytes and the role of exosomes in crosstalk between hepatocytes and macrophages in the development of liver inflammation; and 3) Elucidate the contribution of extracellular vesicles to liver injury caused by both HIV-infection and ethanol consumption in vivo.

**Project Title:** Molecular mechanism of Sestrin2-induced mitophagy under mitochondria-damaging stress

**Principal Investigator:** Seung-Hyun Ro, Ph.D.

**Description:** To prevent mitochondrial disease and maintain healthy mitochondria in humans, it is critical to understand the mechanisms that protect mitochondria after exposure to stress (e.g., hypoxia, nutrient stress or oxidative stress). Sestrin2 is a stress-sensing protein that induces autophagy and regulates mitophagy. Sestrin2 was recently shown to phosphorylate autophagy kinase ULK1. This project will conduct studies to delineate the underlying molecular mechanism of how the Sestrin2-ULK1 pathway controls mitochondria homeostasis through the fine-tuned regulation of mitophagy.

**Project Title:** Developing therapeutic strategies to combat influenza and treat HIV

**Principal Investigator:** Daniel Schachtman, Ph.D.

**Description:** Support for the Center for Biotechnology will be used to further research into the immune response to influenza and develop vaccine strategies to combat antigenic drift and shift in inherent circulating influenza A viruses. Researchers also will test the efficacy of HIV treatment, prevention and vaccines in animal models.

**Project Title:** Carbohydrates and Children

**Principal Investigator:** Joel Cramer, Ph.D.

**Description:** This proof-of-concept clinical trial will evaluate the impact of two carbohydrate blends on resting and exercise metabolism, glucose, insulin and hunger scores in pre-adolescent boys and girls. At the baseline visit, qualifying subjects will be enrolled in the study. Assessments will include dual-energy X-ray absorptiometry for body composition, submaximal VO<sub>2</sub> testing on a stationary bicycle and collection of a three-day dietary log. The dietary logs will be used to estimate energy intake so that food can be prepared and packaged, since each subject will be asked to eat a controlled diet for three days prior to both study test visits. Study test visits will be separated by seven to 14 days. During each study test visit, resting and exercise metabolism will be assessed with a metabolic cart that measures the oxygen and carbon dioxide in the subjects exhaled breath. Five small blood samples will be collected and tested for glucose and insulin concentrations. Lastly, hunger levels will be assessed by asking the subjects to rate their level of hunger on a sliding scale (0-100) before each blood sample is collected. Hunger levels will also be quantified by measuring the amount of ad libitum food consumed at the end of the study period, which lasts three and a half to four hours.

**Project Title:** Demonstrate Efficacy of Low-Intensity-Ultrasound in Improving Microfracture Outcomes

**Principal Investigator:** Anu Subramanian, Ph.D.



**Description:** The degeneration of cartilage at load-bearing joints causes considerable musculoskeletal morbidity and is a major healthcare burden in the United States. The goal of the proposed research is to develop a novel method to improve the therapeutic outcomes of microfracture in an animal model by engineering a treatment modality that delivers low-intensity ultrasound, or LIUS, with chondroinductive and chondroprotective properties to the defect site. Two specific aims will be undertaken: 1) Develop a theoretical basis for LIUS therapy; 2) Demonstrate efficacy of LIUS in improving microfracture outcomes in a rabbit model of chondral injury.

**Project Title:** Molecular mechanism for phenazine ring modifications during biosynthesis of the redoxactive antibiotics

**Principal Investigator:** Liangcheng Du, Ph.D., and Limei Zhang, Ph.D.

**Description:** Phenazines are heterotricyclic N-containing aromatic compounds, and over 150 phentanzine natural products have been isolated from diverse microorganisms. The goal of this proposal is to determine the molecular mechanism by which the phenazine ring is tailored into a series of bioactive natural products and the biological functions of the resulting products. To reach this goal, three specific objectives are proposed: 1) Characterize the activity and selectivity of four tailoring enzymes encoded by the LaPhz gene cluster; 2) Determine the structure-mechanism relationships of the four enzymes; and 3) Elucidate biological functions of the phenazines in *Lysobacter*.

**Project Title:** Engineered Fibrin-Assisted Wound Healing

**Principal Investigator:** Bill Velander, Ph.D.

**Description:** This project proposes to engineer fibrin to better act as both a hemostatic barrier and a provisional matrix that improves wound healing. Work will focus on manipulating healing at the temporal interface between hemostasis and early stages of cell recruitment at a wound site, targeting the simultaneous deposition of human fibrin from a novel subpopulation of fibrinogen called GG:F1, along with fibronectin.

**Project Title:** UNL Biomedical and Science Teacher Connector

**Principal Investigator:** Judy Diamond, Ph.D.

**Description:** Hosting this event builds a strong relationship between the Lincoln Public Schools science educators, NIH's BioHuman Science Education Partnership Award project and staff, University of Nebraska State Museum community and UNL's research community. By partnering with LPS, the district teachers are repeatedly exposed to BioHuman SEPA and other virology and microbiology content related to the project, given access to deliverables and other resources from the project, and are introduced to diverse resources and personnel. As a result of this exposure, a significant percentage of teachers connect with university faculty to incorporate additional content in their classes and also used BioHuman SEPA deliverables with their students.

**Project Title:** Peripheral Nerve Regeneration with Novel Graphene Nerve Guidance Conduit

**Principal Investigators:** Yung Yul Lim, Ph.D., and Alexander Sinitiskii, Ph.D.

**Description:** Peripheral nerve injury accompanies reductions in motor function and sensory perception, resulting in severe neuropathies. The goal of this project is to develop nerve guidance conduits (NGCs) based on novel graphene materials to advance the strategy for treating peripheral nerve injuries. The team proposes to exploit the potential intrinsic capability of graphene to trigger/support neurogenesis as evidenced in our preliminary data. Researchers will examine Schwann cell response to graphene substrate culture, as Schwann cells play a key guidance role in axonal regrowth and myelination in injured peripheral nerves. Researchers will then perform animal tests using the rat sciatic nerve injury model to investigate the feasibility of developed graphene NGCs and hollow pipe and multi-channel shapes to stimulate peripheral nerve repair.

**Project Title:** Faculty Development in Biomedical Sciences

**Description:** As a result of this program, the university hosts faculty workshops led by nationally recognized grant writing consultants, enhancing the university's competitiveness for federal funding.

## Minority Health Research Grants

**Introduction:** A total of \$194,855, or 7 percent of the total allocation, was invested in seven projects to address the health needs of underserved racial and ethnic minorities in Nebraska and across the U.S. Two of the projects support research conducted by the Minority Health Disparities Initiative, which focuses on advancing scientific research, data integration, policy, practice and training related to health issues experienced by minority populations in Nebraska and the nation. The remaining awards address minority health disparities by empowering children and families to make healthy food choices to change the rising epidemic of childhood obesity or investigate mental health issues in immigrant and/or refugee populations, Latino populations or African American populations. Together, these efforts address the goal to identify, and eventually eliminate, race- and ethnicity-based health disparities in Nebraska and throughout the U.S.

**Project Title:** Minority Health Disparities Initiative

**Principal Investigator:** Dan Hoyt, Ph.D.

**Description:** This funding helps connect faculty with minority health research projects to allow faculty to present their research at Nebraska minority health conferences. It also provides a mechanism to connect UNL with statewide stakeholders through participation in the Nebraska Minority Health Council.

**Project Title:** Minority Health Disparities Initiative

**Principal Investigator:** Kirk Dombrowski, Ph.D.

**Description:** The MHDl sponsors functions including visiting speakers (selected and hosted by faculty affiliates), conversation series (led by faculty affiliates), a writing retreat and annual edited volume (works of affiliated faculty), a summer National Science Foundation-funded Research Experiences for Undergraduates program (for research with affiliated faculty), and undergraduate research assistant support for MHDl faculty. It also provides community outreach and project management for research and evaluation projects by MHDl-affiliated faculty. In 2018, faculty have assisted in preparing grant proposals totaling approximately \$20 million.

**Project Title:** Health Issues in Immigrant Refugee Populations

**Principal Investigators:** Trey Andrews, Ph.D., and Sergio Wals, Ph.D.

**Description:** This project focuses on understanding mental health disparities among Latino populations, particularly immigrant and Spanish-speaking populations. The goals of the research are to understand what contributes to lower use of numerous healthcare services and poorer mental health treatment outcomes in this population.

**Project Title:** Creating a Foundation for CBPR with Refugees in Nebraska: Mental Health Pilot Research with Ethnic Community-Based Organizations

**Principal Investigator:** Julie Tippens, Ph.D.

**Description:** This project is gathering pilot data on health stressors experienced, and coping responses, among refugee and immigrant populations. Working with the Asian Center and El Centro de las Americas, focus groups have been completed with refugees from Burma (ethnic Karen and Karenni), Mexico, Iraq, South Sudan and Sudan. The goal is

to develop models of stress and coping that incorporate the unique contributions of ethnicity and culture.

**Project Title:** Interuniversity Collaboration on Minority Health

**Principal Investigator:** Bridget Goosby, Ph.D.

**Description:** This funding supported a meeting to conduct collaborative grant planning with Northwestern University scholars Thom McDade, a bioanthropologist, and Emma Adam, a biopsychologist. Preliminary plans were made to submit a National Institutes of Health proposal to apply the use of ambulatory monitors of sympathetic nervous activation and measure inflammatory markers in studies of stress among African Americans.

**Project Title:** Minority Health Data

**Principal Investigator:** Jolene Smyth, Ph.D.

**Description:** Support was provided to collect minority health data on the Nebraska Annual Social Indicators Survey. An omnibus, collaborative effort to collect data on immigrant and minority health issues in Nebraska was conducted. Multiple UNL faculty affiliated with the Minority Health Disparities Initiative submitted questions that could provide pilot data for their respective research projects.

**Project Title:** Project Inspire Youth

**Principal Investigator:** Lisa Pytlik Zillig, Ph.D.

**Description:** Project Inspire Youth addresses minority health disparity gaps by providing tools to empower children to positively impact health outcomes. The project aim is to encourage youth to become active in healthy choices for food by engaging them, and their families, to grow healthy vegetables by providing tools to empower children and families to make changes to stem the rising epidemic of childhood obesity.

## Joint UNL-UNMC Research Projects

**Introduction:** UNL and UNMC faculty often offer complementary research expertise to address biomedical problems that cannot be solved alone by individual investigators from either institution. To facilitate team building and preliminary data acquisition across the two institutions, a total of \$70,000 in NTSBRDF funds was used to support two projects from teams that include UNL and UNMC researchers.

**Project Title:** From Community to Clinical Trials: Translating Tools and Expanding Partnerships in Preparation for Clinical Trials to Reduce Mental Health Disparities in Underserved Transgender Communities

**Principal Investigator:** Deb Hope, Ph.D., UNL, Jane Meza, Ph.D., UNMC, and Richard MocarSKI, Ph.D., University of Nebraska at Kearney

**Description:** There is increasing recognition by society that some individuals do not fit easily into a male/female binary gender that was assigned at birth, known as being transgender or gender non-conforming (trans for short). Our multidisciplinary research team has been partnering with the Central Great Plains trans community to develop principles of care for psychological services that can prepare mental health providers to provide culturally competent services to this high-need community. We are also developing an assessment tool to help inform that care. This application has two specific aims. The first aim is to add two additional sites at the University of South Dakota and the University of Alabama and validate the principles of care at those sites. The second aim is to conduct a psychometric evaluation of our assessment tool.

**Project Title:** Development of Ion Channel Blockers for Influenza D Virus

**Principal Investigator:** Hideaki Moriyama, Ph.D., UNL

**Description:** There are many opportunities for contact with livestock in the agricultural areas of the central United States. A new type of influenza virus, known as type D, has recently been detected in cattle and pigs. Influenza D virus infection of cattle is typically asymptotic; however, infection of swine can result in clinical disease. As a result, swine could serve as a “mixing vessel” for highly pathogenic influenza viruses, including those with zoonotic potential into the human population. The best way to prevent infection is through administration of an efficacious vaccine. However, once infection takes place, the only treatment option is the use of anti-virals. Currently, the only anti-viral that targets the influenza M2 protein ion channel is semi-effective. In this proposal, we will study the influenza D type M2 protein as a target to develop a novel ion channel blocking compound.

**CREIGHTON UNIVERSITY**  
**Nebraska Tobacco Settlement**  
**Biomedical Research Development Fund (NTSBRDF)**  
Year 17: July 1, 2017-June 30, 2018  
**Progress Report**

## **Executive Summary**

The Creighton University investment of the Nebraska Tobacco Settlement Biomedical Research Development Fund dollars is concentrated in three areas:

- Strategic Faculty Recruitment and Retention
- Research Program and Infrastructure Development
- Minority Health Research Grants.

With the support of the NTSBRDF, Creighton University continues to address some of the world's most complex and perplexing health care challenges. Research investigators play a fundamental role in enhancing the quality of life for individuals and in expanding the research community in Nebraska and the region. The primary purpose and use of the NTSBRDF program at Creighton University is to increase funding from federal health agencies and institutes. In 2017-2018, the collective efforts of the research investigators at Creighton University produced significant results. Creighton University received over \$21.6 million in extramural funding. Investigators were awarded federal grants from the Department of Defense, National Institutes of Health, Office of Naval Research, and Centers for Disease Control and Prevention, as well as many other non-federal grants from corporations and foundations. The university and its investigators look forward to continuing to use NTSBRDF funds as a springboard to benefit the citizens of Nebraska and to add to research and health care knowledge everywhere.

## Strategic Faculty Recruitment and Retention

A total of \$435,840 was invested in strategic recruitment and retention of faculty at Creighton University. The NTSBRDF provided us the opportunity to expand on existing centers of excellence and develop new avenues of biomedical research. The new faculty have already contributed to the Creighton University research portfolio by transferring active awards or obtaining new extramural awards totaling \$1,779,345 during this reporting period. These new awards are from agencies such as the National Institutes of Health, Office of Naval Research, Department of Defense, and the Simons Foundation.

**Investigator:** Holly Stessman, PhD

**Position Title & Department:** Assistant Professor, School of Medicine, Department of Pharmacology

**Project Title:** Identifying Genetic Drivers of Complex Human Disease

**External Funding:**

Current Year Funding Total: \$410,000

Funding Sources: NE-DHHS, Simons Foundation

**Investigator:** Gopal Jadhav, PhD

**Position Title & Department:** Assistant Professor, School of Medicine, Department of Clinical and Translational Sciences

**Project Title:** Development of Small Chemical Molecules of Novel TREM-1 Antagonists

**External Funding:**

Current Year Funding Total: \$100,000

Funding Sources: NE-DHHS

**Investigator:** Halvor McGee, PhD

**Position Title & Department:** Assistant Professor, School of Medicine, Department of Clinical and Translational Sciences

**Project Title:** Microbial Composition of Cartoid Plaque and Associations with Clinical Outcomes and A Study of Trem-1 and Dendritic Cells in the Pathogenesis of Severe Asthma

**External Funding:**

Current Year Funding Total: \$100,000

Funding Sources: NE-DHHS

**Investigator:** Chandra Boosani, PhD

**Position Title & Department:** Assistant Professor, School of Medicine, Department of Clinical and Translational Sciences

**Project Title:** Epigenetic Regulations in Cardiovascular Diseases

**External Funding:**

Current Year Funding Total: \$60,000

Funding Sources: NE-DHHS

**Investigator:** Ann Cavanaugh, PhD

**Position Title & Department:** Assistant Professor, College of Arts & Sciences, Department of Biology

**Project Title:** Analysis of the Budding Yeast Microtubule Organizing Center

**External Funding:**

Current Year Funding Total: \$82,500

Funding Sources: NE-DHHS

**Investigator:** Travis Bourret, PhD

**Position Title & Department:** Assistant Professor, School of Medicine,  
Department of Microbiology and Immunology

**Project Title:** Metabolic Regulation of Salmonella Virulence

**External Funding:**

Current Year Funding Total: \$60,722

Funding Sources: NE-DHHS

**Investigator:** Anna Selmecki, PhD

**Position Title & Department:** Assistant Professor, School of Medicine,  
Department of Microbiology and Immunology

**Project Title:** Molecular Mechanisms on Genome Stability

**External Funding:**

Current Year Funding Total: \$235,746

Funding Sources: NE-DHHS

**Investigator:** Tal Teitz, PhD

**Position Title & Department:** Assistant Professor, School of Medicine,  
Department of Pharmacology

**Project Title:** Drug Development for Hearing Disorders

**External Funding:**

Current Year Funding Total: \$62,500

Funding Sources: NE-DHHS

**Investigator:** Jian Zuo, PhD

**Position Title & Department:** Professor & Chair, School of Medicine,  
Department of Biomedical Sciences

**Project Title:** Neurodegeneration, Function, Regeneration and Protection of  
Sensory Hair Cells in the Inner Ear

**External Funding:**

Current Year Funding Total: \$1,504,345

Funding Sources: NE-DHHS, ONR, NIH, DOD

## **Research Program and Infrastructure Development**

A total of \$1,059,701 was invested in research program and infrastructure development in 2017-2018 in a wide variety of topics, including 1) Mechanisms of Biological Aging of Cochlear Hair Cells 2) Identification of HIV-1 Latency-Associated Biomarkers, and 3) Defining Shoulder Injury by Matrisome Disorganization & TREM-Meditated Inflammation. Moreover, the Research Program and Infrastructure Development portion of the NTSBRDF supported biomedical research by providing pilot project funding, bridge funding, support for research equipment, and core facility support for research faculty.

**Investigator:** Thomas Murray, PhD  
**Position Title & Department:** Provost & Professor, School of Medicine, Department of Pharmacology  
**Project Title:** Neuropharmacology Postdoctoral Support  
**External Funding:**  
Current Year Funding Total: \$315,964  
Funding Sources: NE-DHHS, DOD, NIH

**Investigator:** Jason Bartz, PhD  
**Position Title & Department:** Associate Dean for Faculty Affairs & Professor, School of Medicine, Department of Microbiology and Immunology  
**Project Title:** Prion Disease Research Support  
**External Funding:**  
Current Year Funding Total: \$839,856  
Funding Sources: NE-DHHS, NIH

**Investigator:** Katie Packard, PhD  
**Position Title & Department:** Professor, School of Pharmacy & Health Professions  
**Project Title:** Finances First: A Health Intervention for Low-Income Single-Mother Households  
**External Funding:**  
Current Year Funding Total: \$100,000  
Funding Sources: NE-DHHS

**Investigator:** Matthew Dilisio, MD  
**Position Title & Department:** Assistant Professor, School of Medicine, Department of Surgery  
**Project Title:** Defining Shoulder Injury by Matrisome Disorganization & TREM-Meditated Inflammation  
**External Funding:**  
Current Year Funding Total: \$60,000  
Funding Sources: NE-DHHS

**Investigator:** David He, PhD  
**Position Title & Department:** Professor, School of Medicine, Department of Biomedical Sciences  
**Project Title:** Cellular and Molecular Mechanisms of Age-Related Degeneration of Cochlear Hair Cells  
**External Funding:**  
Current Year Funding Total: \$551,639  
Funding Sources: NE-DHHS, NIH

**Investigator:** Michael Belshan, PhD  
**Position Title & Department:** Associate Professor, School of Medicine, Department of Microbiology and Immunology  
**Project Title:** Identification of HIV-1 Latency-Associated Biomarkers  
**External Funding:**



Current Year Funding Total: \$75,000  
Funding Sources: NE-DHHS

**Investigator:** Chris Destache, PharmD  
**Position Title & Department:** Professor, School of Pharmacy and Health Professions, Department of Pharmacy Practice  
**Project Title:** Combined Antiretroviral Drug and Monoclonal Antibody Nanoparticle for HIV-1 Prevention  
**External Funding:**  
Current Year Funding Total: \$619,806  
Funding Sources: NE-DHHS, NIH

**Investigator:** Joseph Knezetic, PhD  
**Position Title & Department:** Director, Research Compliance  
**Project Title:** Research Compliance Regulatory Support  
**External Funding:**  
Current Year Funding Total: \$152,634  
Funding Sources: NE-DHHS

**Investigator:** Joseph Knezetic, PhD  
**Position Title & Department:** Director, Research Compliance  
**Project Title:** Biostatistician Core Facility Support  
**External Funding:**  
Current Year Funding Total: \$152,634  
Funding Sources: NE-DHHS

**Investigator:** Robert Dunlay, MD  
**Position Title & Department:** Dean, School of Medicine  
**Project Title:** School of Medicine Research Faculty Bridge Funding  
**External Funding:**  
Current Year Funding Total: \$303,726  
Funding Sources: NE-DHHS

**Investigator:** Beth Herr  
**Position Title & Department:** Director, Sponsored Programs Administration  
**Project Title:** Elsevier Pure Master Software  
**External Funding:**  
Current Year Funding Total: \$45,560  
Funding Sources: NE-DHHS

**Investigator:** David He, PhD  
**Position Title & Department:** Professor, School of Medicine, Department of Biomedical Sciences  
**Project Title:** Mechanisms of Biological Aging of Cochlear Hair Cells  
**External Funding:**  
Current Year Funding Total: \$551,639  
Funding Sources: NE-DHHS, NIH

**Investigator:** Devendra Agrawal, PhD  
**Position Title & Department:** Professor & Chair, School of Medicine,  
Department of Clinical and Translational Sciences  
**Project Title:** Clinical and Translational Science Animal Research  
**External Funding:**  
Current Year Funding Total: \$1,565,365  
Funding Sources: NE-DHHS, NIH

**Investigator:** Meghan Potthoff, PhD  
**Position Title & Department:** Assistant Professor, College of Nursing  
**Project Title:** Accelerating Inter-Professional Community-Based Education and  
Practice Sites  
**External Funding:**  
Current Year Funding Total: \$1,485  
Funding Sources: NE-DHHS

**Investigator:** Henry Lynch, MD  
**Position Title & Department:** Professor & Chair, School of Medicine,  
Department of Preventive Medicine  
**Project Title:** Labvantage Solutions Software System  
**External Funding:**  
Current Year Funding Total: \$390,159  
Funding Sources: NE-DHHS

## Minority Health Research Grants

**Introduction:** Creighton's core values include the inalienable worth of each individual and appreciation of ethnic and cultural diversity coupled with service to others. As such, continues to support Creighton University's Center for Promoting Health and Health Equality and its commitment to improving the health of racial and ethnic minorities. A total of \$189,124 was awarded in 2017-2018 for minority health research.

**Investigator:** Sade Kosoko-Lasaki, MD  
**Position Title & Department:** Associate Vice Provost – Health Science  
Multicultural and Community Affairs  
**Expertise:** Center for Promoting Health and Health Equality (CPHHE)  
**External Funding:**  
Current Year Funding Total: \$534,172  
Funding Sources: NE-DHHS, CDC

**BOYS TOWN NATIONAL RESEARCH HOSPITAL  
Nebraska Tobacco Settlement Biomedical  
Research Development Fund (NTSBRDF)**

Year 17: July 1, 2017–June 30, 2018  
Progress Report

## **Executive Summary**

This report is modeled on the annual reports we have provided for the last sixteen years. Annual reports have divided Development Fund activities into three categories: 1) Strategic Faculty Recruitment & Retention; 2) Research Program & Infrastructure Development; and 3) Minority Health Research Grants. We will continue to use those categories so that these periodic reports tie to the subsequent annual report. We have modified the format for the first category to provide additional information regarding expenditures. The allocation numbers here are cumulative and rounded to the nearest dollar.

### **Strategic Faculty Recruitment & Retention**

**Introduction:** Most entries in this category represent multiple-year start-up packages for new investigators. As they obtain external support and become fully independent, they drop off the list making way for new people. We also support established laboratories to allow them to maintain active research programs despite short-term lapses in funding.

**Investigator:** Monita Chatterjee, PhD

**Position Title & Department:** Director of the Auditory Protheses and Perception Laboratory, Lied Learning and Technology Center.

**Expertise:** Use of behavioral methods to compare the perception of subjects with cochlear implants to the perception of subjects with normal acoustic hearing.

**Allocation:** \$ 4,224

**Description of Goals and Accomplishments:** Start-up package funds are being used to support collection of preliminary data for competitive renewal of an NIH grant application.

**Investigator:** Barbara Morley, PhD

**Position Title & Department:** Director of the Auditory Neurochemistry Laboratory, Center for Sensory Neuroscience.

**Expertise:** Use of molecular methods to study the development of neurotransmitters in the auditory brainstem nuclei.

**Allocation:** \$ 17,480

**Description of Goals and Accomplishments:** Funds are being used to support collection of preliminary data for an NIH grant application by a long-term faculty member who has had a lapse in funding.

**Investigator:** Soyoun Cho, PhD

**Position Title & Department:** Director of the Hair cell Biophysics Laboratory, Center for Sensory Neuroscience.

**Expertise:** Measurement of physiological responses within the inner ear.

**Allocation:** \$75,789

**Description of Goals and Accomplishments:** Start-up package funds are being used to support purchase of laboratory equipment and collection of preliminary data for an NIH grant application.

**Investigator:** Shuman He, PhD

**Position Title & Department:** Director of the Human Auditory Electrophysiology Laboratory, Center for Hearing Research.

**Expertise:** Use of auditory evoked potentials in the assessment of patients with auditory brainstem implants.

**Allocation:** \$ 4,914

**Description of Goals and Accomplishments:** Start-up package funds are being used to support purchase of laboratory equipment and collection of preliminary data for an NIH grant application.

**Investigator:** Lori Leibold, PhD

**Position Title & Department:** Director of the Human Auditory Development Laboratory and of the Center for Hearing Research.

**Expertise:** Measurement of sensory and cognitive function in infants and children.

**Allocation:** \$ 5,413

**Description of Goals and Accomplishments:** Start-up package funds are being used to support purchase of laboratory equipment and transition of her research program from the University of North Carolina to BTNRH.

**Investigator:** Douglas Keefe, PhD

**Position Title & Department:** Director of the Physical Acoustics Laboratory.

**Expertise:** Measurement and modeling of middle and inner ear function.

**Allocation:** \$ 130,217

**Description of Goals and Accomplishments:** Funds are being used to support a collaborative project with the Veterans Administration.

**Investigator:** Edward Walsh, PhD

**Position Title & Department:** Director, Developmental Auditory Physiology Laboratory, Center for Sensory Neuroscience.

**Expertise:** Physiological measurement of peripheral and central auditory function.

**Allocation:** \$1,644

**Description of Goals and Accomplishments:** Funds are being used to support a collaborative project with the Office of naval Research regarding an experimental drug to reduce the effects of noise exposure and pilot projects not supported by ONR.

**Investigator:** Yunxia Lundberg, PhD

**Position Title & Department:** Coordinator of the Vestibular Neurogenetics Laboratory, Center for Sensory Neuroscience.

**Expertise:** Expression of genes and characterization of proteins in the vestibular sense organ, genetics of benign paroxysmal positional vertigo (BPPV).

**Allocation:** \$ 101,853

**Description of Goals and Accomplishments:** Funds are being used to supplement support provide by a K award (training grant) from NIH to develop a research program in human genetics by a long-term faculty member.

**Investigator:** Marisa Zallocchi, PhD

**Position Title & Department:** Director of the Functional Genetics Laboratory, Center for Sensory Neuroscience.

**Expertise:** Biochemical mechanisms of Usher pathobiology in photoreceptors and cochlear hair-cells; use of zebrafish model to study gene expression and function.

**Allocation:** \$ 254,878

**Description of Goals and Accomplishments:** Start-up package funds are being used to support collection of preliminary data for an NIH grant application.

**Investigator:** Adam Bosen, PhD

**Position Title & Department:** Director of the Auditory Perceptual Encoding Laboratory, Center for Hearing Research.

**Expertise:** The effects of perceptual encoding of auditory stimuli on speech recognition in children and adults with cochlear implants.

**Allocation:** \$ 52,003

**Description of Goals and Accomplishments:** Dr. Bosen was recruited for the BTNRH Center for Biomedical Research Excellence (COBRE) grant program. Start-up package funds are being used to support collection of preliminary data for an NIH grant application.

**Investigator:** Sophie Ambrose, PhD

**Position Title & Department:** Director of the Communication Development Laboratory, Center for Childhood Deafness, Learning and Language.

**Expertise:** Optimizing speech and language outcomes in children who are deaf or hard of hearing through evidence-based intervention programs.

**Allocation:** \$ 14,860

**Description of Goals and Accomplishments:** Dr. Ambrose was recruited for the BTNRH Center for Biomedical Research Excellence (COBRE) grant program. Start-up package funds are being used to support collection of preliminary data for an NIH grant application.

**Investigator:** Kaylah Lalonde, PhD

**Position Title & Department:** Director of the Audiovisual Speech Processing Laboratory, Center for Hearing Research.

**Expertise:** Examining the underlying mechanisms for audiovisual speech recognition for children with normal hearing and children with hearing loss.

**Allocation:** \$ 126,811

**Description of Goals and Accomplishments:** Dr. Lalonde was recruited for the BTNRH Center for Biomedical Research Excellence (COBRE) grant program. Start-up package funds are being used to support collection of preliminary data for an NIH grant application.

**Investigator:** Angela AuBuchon, PhD

**Position Title & Department:** Director of the Memory and Language Laboratory, Center for Hearing Research.

**Expertise:** The development of working memory in children, including describing the emergence of rehearsal strategies and interactions with language development.

**Allocation:** \$ 129,228

**Description of Goals and Accomplishments:** Dr. AuBuchon was recruited for the BTNRH Center for Biomedical Research Excellence (COBRE) grant program. Start-up package funds are being used to support collection of preliminary data for an NIH grant application.

**Investigator:** Katherine Gordon, PhD

**Position Title & Department:** Director of the Language and Memory Laboratory, Center for Childhood Deafness, Learning and Language.

**Expertise:** Cognitive and linguistic mechanisms that support the process of word learning and language development in children who are typically-developing.

**Allocation:** \$ 36,209

**Description of Goals and Accomplishments:** Dr. Gordon was recruited for the BTNRH Center for Biomedical Research Excellence (COBRE) grant program. Start-up package funds are being used to support collection of preliminary data for an NIH grant application.

**Investigator:** Karla McGregor, PhD

**Position Title & Department:** Director of the Word Learning Laboratory, Center for Childhood Deafness, Learning and Language.

**Expertise:** Improving outcomes for children and adolescents with developmental language disorders.

**Allocation:** \$ 22,762

**Description of Goals and Accomplishments:** Dr. McGregor was recruited as the next Director for the Center for Childhood Deafness, Learning, and Language. Start-up package funds are being used to support collection of preliminary data for an NIH grant application.

**Investigator:** Gabrielle Merchant, PhD

**Position Title & Department:** Director of the Translational Auditory Physiology and Perception Laboratory, Center for Hearing Research.

**Expertise:** Modelling of the middle ear and studies of the effects of otitis media on perceptual development in children.

**Allocation:** \$ 31,800

**Description of Goals and Accomplishments:** Dr. Merchant was recruited for the BTNRH Center for Biomedical Research Excellence (COBRE) grant program. Start-up package funds are being used to support collection of preliminary data for an NIH grant application.

## Research Program & Infrastructure Development

**Project Title:** Animal Care Facility Core

**Principal Investigator:** Barbara Morley, PhD

**Amount of Funding:** \$ 113,433

**Description of Goals and Accomplishments:** Core support is necessary to maintain adequate staffing levels and uniform *per diem* charges in the Animal Care Facility in spite of fluctuating levels in the use of the facility. In this budget period, we purchased a new Lynx cage washer and Nuair Biological Safety Cabinets to replace old equipment in the animal care facility.

**Project Title:** Electron Microscopy Core

**Principal Investigator:** Ryan McCreery, PhD

**Amount of Funding:** \$ 2,854

**Description of Goals and Accomplishments:** BTNRH relies on electron microscopy core services provided by UNMC, but rates are significantly higher for non-UNMC users than for those at UNMC. This fund covers the difference in costs, giving BTNRH users the equivalent of in-house UNMC rates. This is far less expensive than developing our own core facilities and will be expanded to cover other core services.

**Project Title:** Sensory Neuroscience Center Core Support

**Principal Investigator:** Dominic Cosgrove, PhD

**Amount of Funding:** \$ 26,328

**Description of Goals and Accomplishments:** Funds were allocated for supplemental support of programs and core functions in the Center for Sensory Neuroscience, including the Vestibular Neurogenetics, Cell Signaling and Gene Marker Laboratories and the Genotyping Core.

**Project Title:** Hearing Research Center Core Support

**Principal Investigator:** Lori Leibold, PhD

**Amount of Funding:** \$ 87,611

**Description of Goals and Accomplishments:** Funds are budgeted for supplemental support of programs and core functions in the Center for Hearing Research, where we will be establishing new laboratories to assure success of a competitive renewal application for the Center for Perception and Communication in Children. The money will be used to fund laboratory facilities such as sound rooms that are not included in start-up packages. In this budget period, we purchased a new sound-treated audiometric test suite for a new laboratory space.

**Project Title:** Childhood Deafness Center Core Support

**Principal Investigator:** Mary Pat Moeller, PhD

**Amount of Funding:** \$ 5,135

**Description of Goals and Accomplishments:** Funds are budgeted for supplemental support of programs and core functions in the Center for Childhood Deafness, Language and Learning, where we will be creating a new program in language research with several laboratories.

**Project Title:** New Projects Fund

**Principal Investigator:** Lori Leibold, PhD

**Amount of Funding:** \$10,122

**Description of Goals and Accomplishments:** A central fund was continued in Year 16 to provide startup funds for pilot projects proposed by current members of the BTNRH research and clinical staff. This money was used to provide honoraria for research subjects and to cover minimal supply costs.

**Project Title:** Recruitment Fund  
**Principal Investigator:** Ryan McCreery, PhD  
**Amount of Funding:** \$ 12,972

**Description of Goals and Accomplishments:** A recruitment fund allows us to separate the costs of advertising, moving and interviewing candidates from the costs of individual recruitment packages. The initial costs of recruitment occur well in advance of the start date for a position. Moving costs vary and are generally handled separately from start-up funds.

**Project Title:** Postdoctoral Training  
**Principal Investigator:** Douglas Keefe, PhD  
**Amount of Funding:** \$ 6,245

**Description of Goals and Accomplishments:** The longest running NIH grant at BTNRH provides support for a postdoctoral training program. It was renewed during Year 14 for training grant years 36 through 40. The postdoctoral fellows contribute in many ways to the success of the research program as a whole. The grant does not support the cost of recruiting postdoctoral fellows and provides minimal support for travel to national meetings. We supplement stipends to make competitive offers. We have therefore created a fund to support those costs.

## Minority Health Research Grants

**Introduction.** In Year 16 we have continued two projects reported in previous years. The first is key to all of our efforts to expand research in areas related to minority health. The second is a study of the problems associated with testing people in English and Spanish.

**Project Title:** Minority Recruitment  
**Investigator:** Mary Pat Moeller, PhD  
**Amount of Funding:** \$ 31,537

**Description of Goals and Accomplishments:** The Minority Recruitment project has continued to be successful in greatly increasing the representation of minority subjects in our NIH-funded research studies. The funds have been used to provide support for translation of consent forms and other documents, interpreters to aid in the consent process, and consultants in the minority communities. The value of this effort was increased by the presence of an NIH-funded Human Subjects Research Core at BTNRH that facilitates recruitment of subjects for all NIH-funded clinical studies. By attaching the Minority Recruitment effort to the existing core function, we have been able to spread the benefit of a proactive minority recruitment program across many laboratories. Typical minority participation in our research studies is well above the representation of minorities in our community.

**Project Title:** Spanish-English Bilinguals  
**Investigator:** Lori Leibold, PhD  
**Amount of Funding:** \$ 35,959

**Description of Goals and Accomplishments:** The goal of this project has shifted to development of an efficient test of speech perception that will allow audiologists to accurately assess functional auditory skills in children who speak English, Spanish or both languages. Speech perception testing is a critically important tool for assessing children's



hearing, determining candidacy for sensory devices and guiding language intervention. Over 15% of children in the US are raised in Spanish-speaking homes, but speech perception testing is typically performed in English or omitted altogether, due to a lack of appropriate test materials and a shortage of Spanish-speaking audiologists. NTSBRDF funds are providing partial support for Manual Vincente, a research assistant who is a Spanish-English bilingual. Mr. Vincente helps to recruit bilingual and monolingual Spanish-speaking participants for research studies.