



# Office of Research and Sponsored Programs

2013 Annual Report

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MISSION

Wake Forest University’s Office of Research and Sponsored Programs assists the Associate Provost for Research in building faculty research programs of nationally recognized excellence. Our mission is to assist faculty in their pursuit and management of sponsored activities; to encourage and to support ethical research achievement, especially involving human subjects, in compliance with all relevant laws and regulations; to protect the university’s interests; and to acknowledge and publicize faculty distinction.

CREDITS

The Office of Research and Sponsored Programs gratefully acknowledges Ken Bennett's photographs.

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Dear Researchers,

WFU Reynolda Campus research had a remarkable year. For FY13, total external support for projects exceeded \$9.8 million, the second highest amount in campus history. Despite sequestration and federal budget woes, \$8.4 million of this total, roughly 86%, came from federal sources.

Nearly every department that received sponsored research funding this year increased their total over last year's. At \$2.7 million, the Department of Health and Exercise Science received the most sponsored research dollars, an increase of about \$600K over last year. Physics faculty also did well, receiving almost \$2.5 million.

We are very proud of our former CRADLE program participants, Oana Jurchescu and Timo Thonhauser, both in Physics, who received prestigious CAREER awards from the National Science Foundation in FY13. All faculty and staff who received their first external grant are listed in the last pages of this report.

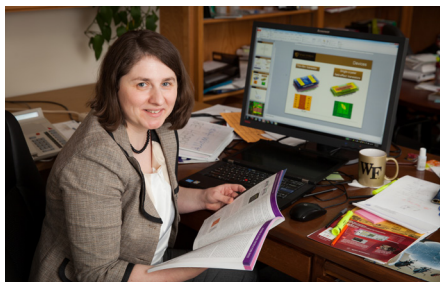
In response to the suspension of the Cross-Campus Collaborative Research Fund this year, we created a new internal award mechanism, the Collaborative Pilot Grant (CPG) program. We awarded 3 grants outright and co-funded another with the Center for Molecular Communication and Signaling. We plan to continue the program in FY14 and look forward to seeing the current projects apply for and receive external funding in the near-future.

We entered Phase II of the TRIAD Interuniversity Project Planning Grants (TIPP). We congratulate the research team of Richard Williams, David Carroll, both in Physics, Abdou Lachgar, Chemistry, and Keerthi Senevirathne, Center for Energy, Environment, and Sustainability and their collaborators at Winston-Salem State University, University of North Carolina at Greensboro, and North Carolina A&T State University. This group received \$100K to continue their research on solar energy.

With a new Provost and Associate Provost for Research, we knew that FY13 was going to be a transition year for the university as well as our office. We are pleased to see how everyone's efforts have resulted in success for our campus. We hope you enjoy reading about some of the exciting projects faculty have developed this year.

Sincerely,  
Lori Messer  
Director

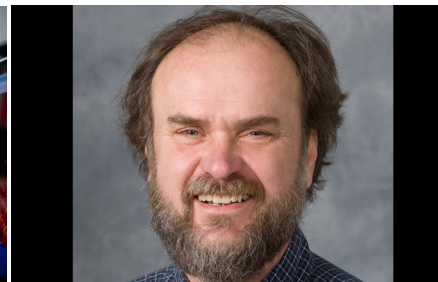
# Outstanding Projects



Oana Jurchescu



Timo Thonhauser



Steven Folmar

Two assistant professors of **Physics** received the National Science Foundation's prestigious Faculty Early Career Development (CAREER) award this year. It supports junior faculty who integrate outstanding research and teaching in the sciences in anticipation of their lifetime achievement.

**Oana Jurchescu** will study *Fundamental Limits of Charge Transport in Organic Semiconductors*. Organic electronics has the potential to achieve transformative applications and introduce "electronics everywhere." This field has witnessed spectacular growth, attracting enormous academic and industrial interest. Dr. Jurchescu's work with plastic electronics may enable new applications such as light, flexible displays; pens with video capability; transparent solar cells that can be placed on a building's windows or the roof of a car to generate electricity; and all affordable.

This project aims to develop large-area, low-cost organic field-effect transistors and organic photovoltaics with unprecedented performance and reproducibility. It will be the first to use single crystals to elucidate charge injection and transport and to design and implement novel materials and device architectures; it will enable nondestructive spray-deposition techniques that can be scaled up to large-area electronics.

Training young scientists in the physics governing the operation of organic electronic devices is critical to their advancement and the field's. Graduate, undergraduate, and high-school students will gain knowledge and skill sets spanning crystal growth and device design, fabrication, and characterization. Dr. Jurchescu will integrate her laboratory infrastructure and results in a new graduate course and outreach programs at the local science museum. Her success, built on previous awards from NSF and the National Institute of Standards and Technology (NIST), will demonstrate to young women that science careers are exciting, fulfilling, and possible.

**Timo Thonhauser** received his CAREER award for *Improving Electronic Structure Theory*, which works to solve the problem of hydrogen storage to advance it as an ideal alternative energy source. Hydrogen is the most abundant element on Earth, and all nations have access to it. It is tasteless, colorless, odorless, nontoxic, can be produced renewably from a variety of sources, and its combustion with pure oxygen produces no air pollutants or greenhouse gases. In practical terms, the energy content of 1 kg of hydrogen corresponds to 3 kg of gasoline, but 3 kg of gasoline produce 9 kg of greenhouse gas.

Unfortunately, problems related to production, storage, and use prevent its development. Several materials called H4-alkanes show great potential for hydrogen storage, but at the moment, all of them release or store hydrogen only at impractically high or low temperatures or pressures. This project uses novel theoretical and computational methods to learn how to stabilize them at ambient pressure and temperature in conjunction with experiments to determine the materials' properties. It will also produce a new computational tool for modeling a wide range of materials from water to DNA, which will be made available to the scientific community through a general public license.

The education plan addresses inadequate mentoring in academic science and educational challenges in a highly diverse region transitioning from an agricultural and manufacturing economy. Dr. Thonhauser is developing an interdepartmental mentoring program for graduate students and postdoctoral fellows to improve their research skills for a smooth transition to independent careers. He is also working with local schools and SciWorks to create an Energy Zone that includes a display, demonstration, teaching module, and informal talks about alternative energy and the potential of hydrogen fuel.

**Steven Folmar, Anthropology, and Lisa Kiang, Psychology**, received an NSF award for research on *Oppression and Mental Health in Nepal*. The project investigates the psychological dimensions of social oppression among three groups: high status (high caste), intermediate status (ethnic group), and low status (Dalit, or untouchable). First, it examines the effects of *cultural models of society* (CMS), according to which people believe membership in their social group is either essential and immutable or acquired and changeable. Following cross-cultural psychological studies in India and Nepal, this project focuses on the relationship of particular CMS to depression and anxiety among adolescents.

Another variable of interest is education, which also has the potential to moderate folk sociologies and influence discriminatory behaviors. A sample of 300 respondents will include children of varying educational attainment in an ethnically and caste-diverse area of Nepal (Lamjung), where education is not universal and where Dr. Folmar has studied for a decade. Dr. Kiang is adapting CMS measures from instruments used in India, Nepal, and elsewhere and incorporating self-report measures of identity, well-being, rejection, and discrimination with other validated, translated, and widely recognized measures of depression and anxiety. Co-PI Guy Palmes, Psychiatry, is further validating the depression and anxiety measures in the field.

In Year 1, questionnaires are being pilot-tested for their appropriateness to the populations under study, and informal interviews and qualitative observations are being conducted in schools. In Year 2, an economic census and survey of 600 households will be conducted to measure important contextual variables, and the refined instruments will be administered to 300 children recruited from these households.

Results will establish whether self-reflection protects children against caste-related depression and anxiety or puts them at greater risk. Armed with information about the prevalence and causes of depression and anxiety, policymakers and professionals can devise better ways for Nepalese schools to teach about identity.

**W. Jack Rejeski and Anthony Marsh, Health and Exercise Science**, have secured National Institutes of Health funding for their Cooperative Lifestyle Intervention Project (CLIP) II, the first large-scale, randomized, controlled clinical trial comparing the efficacy of diet-induced weight loss (WL) alone to WL+physical activity in obese older adults with cardiovascular disease (CVD) or metabolic syndrome

# Outstanding Projects



*Lisa Kiang*



*W. Jack Rejeski*



*Anthony Marsh*

(MetS), which is common in CVD patients and a known risk factor for physical disability. The design can discriminate and evaluate the effects of two different kinds of exercise to develop sound clinical recommendations, and translational significance is increased by delivery of the interventions at community YMCAs.

Diseases of the heart and circulatory system are a major cause of disability after the age of sixty. Experts argue that the primary goal of medical care for older adults with CVD should be improving physical function for as long as possible. At the same time, the American Heart Association identifies weight management as critical to preventing CVD. In 2005, the American Society for Nutrition and the Obesity Society asked for long-term, randomized, controlled clinical trials evaluating the independent and additive effects of diet-induced WL and exercise on mobility, muscle function, and obesity-related diseases in older people.

In response to that call, the first CLIP study randomized 288 obese, older adults with CVD or MetS for 18 months to either aerobic exercise training (AT), AT+WL, or a successful aging (SA) treatment as a control. Mobility improved significantly in the AT group compared to the SA group, but the overall

improvement in the AT+WL group was superior and clinically significant. These interventions were delivered with the aid of North Carolina Cooperative Extension Center agents.

Now, CLIP II focuses on the best exercise regime and the best context for delivery. Due to concerns about loss of lean mass, appropriate WL strategies for older adults remain uncertain. CLIP II will compare the effects on muscle strength and mobility of, first, AT+WL and resistance exercise training (RT) and, second, WL+AT and WL+RT. The study will enable clinicians to recommend physical activity and weight loss programs for their obese older patients who have CVD or MetS. CLIP II is also novel in using the infrastructures of community YMCAs, with Health and Exercise Science staff as trainers and advisers, to promote sustainability.



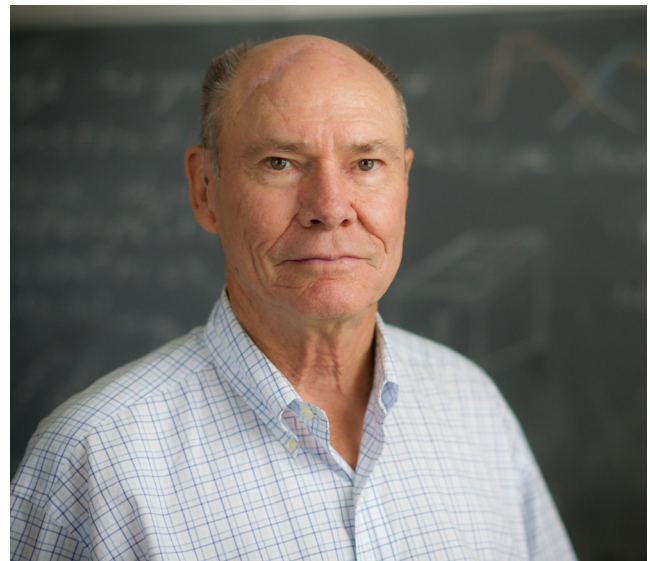
## PROLIFIC WFU RESEARCHER RETIRES

**Bob Plemmons, Z. Smith Reynolds Professor of Computer Science/Mathematics**, retiring from Wake Forest this year, has achieved continuous research funding since 1968, when he was at the University of Tennessee, and later at NC State University, before coming here in 1990. Sponsors include the Air Force Office of Scientific Research (AFOSR), Army Research Office (ARO), Central Intelligence Agency (CIA), Department of Energy (DOE), Intelligence Advanced Research Projects Activity (IARPA), National Geospatial-Intelligence Agency (NGA), National Science Foundation (NSF), National Security Agency (NSA), and North Atlantic Treaty Office (NATO), often with multiple grants per year. He began biometrics projects for the intelligence agencies in 2002, shortly after the 9/11 attack. He is the model of contemporary team-science research in the national interest.

This year, in collaboration with the University of New Mexico and Duke, he continues work at least through 2014 on *Comprehensive Space-object Characterization using Spectrally Compressive Polarimetric Imaging* with funds from the Air Force Office of Scientific Research (AFOSR). With increased deployment of ever-smaller satellites at various altitudes, present-day detection strategies are often inadequate. US space system operators must be able to determine the capabilities of potential adversaries, to warn of an attack, and to predict potential collisions and re-entry impact points. Space Situational Awareness (SSA) gives them four senses: laser-enabled vibrometry listens; chemical sensing with spectrometers sniffs; scatterometry and polarimetry provide surface texture information; and sequential speckle video imaging sees. Hyperspectral and polarimetric imaging go deeper to characterize materials. This system-performance analysis is improving compressive sensor design and information transmission and formulating

computationally efficient data postprocessing algorithms to identify space objects. An experimental program complements and validates project theory, simulation, and processing.

In collaboration with PI **Paúl Pauca** and **Todd Torgersen, Computer Science**, another continuing project, *Implicit Geometry and Linear and Nonlinear Tensor-Based Compression and Restructuring of High-Dimensional Multimodality Data Sets*, is supported by the NGA through the Boeing Company. It is developing a novel framework for effective compression and restructuring of images emanating from many sources. Boeing's IG technology is extremely effective for flexible 3D data representation with minimal loss of fidelity. Here, IG is used to enable fast compression of LIDAR (light detection and ranging) data while facilitating object classification and identification. Wake Forest investigators are conducting hyperspectral (imaging at numerous electromagnetic wavelengths) data analysis for object detection and identification, along with LiDAR data fusion.



Bob Plemmons

# Outstanding Projects

*Challenging Ocular Image Recognition: Biometrics for Personnel Identification/Verification*, funded by the Intelligence Advanced Research Projects Activity (IARPA), was completed this year in collaboration with PI **Paúl Pauca**. The Wake Forest University team worked alone and in collaboration with teams from West Virginia University, Carnegie Mellon University, and Catholic University of America to achieve (1) robust, multispectral ocular recognition algorithms; (2) fast iris and ocular classification algorithms as part of an effective multiscale recognition approach, drawing on Scale-Invariant Feature Transform (SIFT); (3) effective, efficient algorithms fusing ocular imagery acquired by thermal and visible-light color sensors and image-reconstruction and superresolution algorithms; (4) algorithms to improve recognition of video ocular image sequences; (5) robust segmentation and matching routines for ocular image recognition exploring use of a fast segmentation routine for processing nonideal irises; (6) information-theory methods for estimating the performance of ocular image recognition under other nonideal conditions; (7) software to enable fast, accurate simulation of ocular imaging under nonideal scenarios and first-order performance estimates of the recognition algorithms; (8) a test-bed system to facilitate collection of real face and ocular image data under the same or similar conditions as assumed in simulated image data; and (9) C++ software for each of the above tasks.

## WORKSHOP AND CONFERENCE GRANTS

The Mathematics Department continued to secure external support for conferences and workshops. Professor Stephen Robinson and Associate Professor Sarah Raynor were awarded NSF funds to host the Southeastern Atlantic Regional Conference

on Differential Equations (SEARCDE), which has brought new and established researchers together to exchange ideas since 1981. The award covered staffing and supplies and defrayed the travel expenses of the four invited plenary speakers, postdoctoral fellows, and graduate and undergraduate students.

To gain adequate support for the Intensive Workshop for Macaulay2 Development, Assistant Professor Frank Moore submitted a first proposal to the National Security Agency (NSA) in 2012 and a second to the NSF in 2013. Both were approved. The workshop taught participants how to implement algorithms in such rapidly growing areas as numerical algebraic geometry, algebraic statistics, enumerative algebraic geometry, and differential graded algebras, with special attention to Macaulay2, a new parallel computing engine. The workshop provided a great opportunity for graduate students and postdoctoral fellows to enhance their package-writing skills, drawing on the experience and expertise of more senior researchers.

The North Carolina Biotechnology Center supported two conferences in the WFU Schools of Business. Len Preslar, Distinguished Professor of Practice and Executive Director of Health Management Programs, secured funding to host the annual biotechnology conference and case competition.

Charles Johnson (Todd), Executive Director, Charlotte Center, earned support for a conference on Regenerative Medicine: Current Concepts and Changing Trends. Dr. Tony Atala reviewed recent advances and applications for patients with end-stage tissue and organ failure.



# Professional Development

## INTERNAL AWARDS

The Office of Research and Sponsored Programs assists the Provost's Office in administering and coordinating several internal award programs. FY13 awards are as follows:

Collaborative Pilot Grants (CPG)	\$57,620
Science Research Fund	\$88,584
Social, Behavioral, & Economic Sciences Research Fund	\$49,405

The office also manages matching/cost share funds. In FY13 more than \$129K was provided as match/cost share for faculty research projects and other support.



## FACULTY DEVELOPMENT

In FY13, the office spent over \$40K hosting and coordinating workshops and events, supporting research-related committees, and paying for faculty travel to professional development seminars. Some of the supported programs and events are:

- Reception and Dinner to Honor Authors, Editors, and Fine & Performing Artists
- Creative Research Activities Development & Enrichment Program (CRADLE)
- Keys to Increasing Collaboration & Effective Team Building
- Building Research Success at Wake Forest University
- Responsible Conduct of Research Training
- Recognition of Research Excellence
- Scholarly Writing Workshop
- Center and Institute Retreat
- The office edited 53 proposals and other documents and performed over 36 searches for funding opportunities.

# Fellowships

## ANTHROPOLOGY



Sandya Hewamanne, *Subaltern Wars: Sri Lanka's Civil War and Its Aftermath through the Eyes of Soldiers and Former Free Trade Zone (FTZ) Workers*, Short-term Fellowship, American Institute for Sri Lankan Studies (AISLS)

Sri Lanka's 25-year civil war ended in May 2009 after a brutal final phase. This study analyzes the war and its immediate aftermath through the words of former and current soldiers and female Free Trade Zone (FTZ) factory workers in predominantly Sinhala and Buddhist rural villages in southern Sri Lanka. These two working-class groups were enlisted to the elite nationalist project in two different, highly gendered ways—the former as celebrated protectors of the nation; the latter as their stigmatized comfort service (girlfriends).

The overarching goal is to complicate and to challenge the current understanding of civil wars by investigating, first, how marginal actors, male and female, critique elite-led wars while enjoying the advantages of involvement; and, second, how the end of a protracted civil war changes social relations and lived environments to create possibilities for grassroots peace-building and citizen activism. Through intense, long-term participant observation in villages, in-depth interviews, and analysis of letters and creative writing, the project will provide detailed evidence of criticism, changing interpretations, and paths and barriers to peace. Findings will inform humane efforts in all parts of the world where civil wars end through one side's massive violence or precariously balanced treaties.

## ART



David Lubin, *Embattled Visions: American Art and the First World War Art*, William C. Seitz Senior Fellow, Center for Advanced Study in the Visual Arts (CASVA), National Gallery of Art; National Humanities Center (declined)

*Embattled Visions: American Art and the First World War* will be the first book to focus on the US rather than the British or European experience as expressed in oil painting, graphic design, photography, and film. Social and political differences among artists did not collapse in response to the catastrophe. The ongoing clash between modernists and antimodernists and, in a distinct but related struggle, cultural progressives and conservatives sometimes flared and sometimes abated before, during, and after the war. In examining US visual art from 1915-1933 in terms of a tremendous social upheaval, the book will contradict a received wisdom: "The total effect of the war on American art was not great. It was more an interlude than anything else" (*Milton Brown, American Painting from the Armory Show to the Depression* [1955]).

## CLASSICAL LANGUAGES



John Oksanish, *Vitruvian Man: Building the Principate*, National Endowment for the Humanities (NEH) Summer Stipend

The first monograph in English on Vitruvius by a classicist trained in Roman

literary, rather than material, culture examines his influential treatise, *On Architecture*. Until very recently, most classical scholars snubbed it as a grab-bag of technical novelty written by a “half-witted proletarian.” *Vitruvian Man* views it as an index to the massive political changes surrounding its publication: Rome, famously intolerant of kings, came to accept the autocratic rule of Octavian (Augustus) after decades of civil wars had wiped out entire generations, especially in ruling families. Class barriers broke down to accommodate social outliers—including architects like Vitruvius—to administer the “restored” republic. These new experts not only managed the state in practical matters but legitimated its ideology. Vitruvius could promise to transmit the greatness of Augustus’s reign to posterity through buildings in a new ethic of service embodied by the *architectus perfectus* (the ideal architect), but his sophisticated and self-conscious literary construction asserts the architect’s immense commemorative power over the emperor.

## HISTORY



Robert Hellyer, *An American Cup of Green Tea—Made in Japan*, and a related museum exhibit, “Asia in a Cup: Tea in the American Experience, 1750-present,” Robert and Lisa Sainsbury Fellowship, Sainsbury Institute for the Study of Japanese Arts and Cultures.

Foreign trade is usually a dry topic in the hermetic languages of politics and economics. Dr. Hellyer’s work shows what Japan’s development of overseas trade in green tea meant in the lives of its farmers, many ex-samurai; its workers, predominantly women, processing and packing tea in port factories; and its merchants, working with their government and

Western firms on new strategies to market tea in the United States. As Japanese laborers and housewives drank coarser teas, so Midwest farmers, California lumberjacks, and residents of large US cities could enjoy the better teas, the emerging Japanese empire competed with British production of black teas in Ceylon and India, influencing US advertising, food and beverage regulation, and consumption. The related museum exhibit will present new historical perspectives on the reciprocal influence of Chinese, Japanese, Indian, Ceylonese (Sri Lankan), and US cultures. It challenges the popular notion that following the Boston Tea Party (1773), Americans patriotically turned away from tea for coffee. An array of paintings, ceramics, advertising materials, package labels, and historical artifacts will show how tea created rich, multifaceted, durable connections between the United States and Asia.

## RELIGION



Lynn Neal, NEH Visiting Professor of Religion and Visual/Material Culture, University of Richmond

The invitation is part of a module designed to enhance the University of Richmond’s curriculum on intersections between religion and visual or material culture. During the Spring 2014 semester, Dr. Neal will give a public lecture on her research on religion and clothing and teach a class on religion and television.

# Pilot Grants

The Collaborative Pilot Grants (CPG) competition was initiated this year to spark research between Reynolda Campus faculty and other institutions, including Wake Forest Baptist Health (WFBH). Up to \$20,000 was awarded to each project for one year, with the possibility of a one-year, no-cost extension, to develop the preliminary data needed to secure external support. The results are exciting and bode well to achieve that goal.

Dean **Jacquelyn Fetrow**, Reynolds Professor of Computational Biophysics, will develop an *Automated pipeline for prediction and curation of enzyme molecular function*, with Dr. Kimberly Nelson, WFBH, and Professors Patricia C. Babbitt and Thomas Ferrin, University of California at San Francisco. Growing genome sequence databases and misannotation rates over 50 percent for some protein families demonstrate the need for new computational approaches. With programs developed at WFU, the Structure-Function Linkage Database (SFLD) at UCSF may be able to identify and cluster a protein's sequence automatically based on its structure. The project will provide proof-of-concept for this automated pipeline and apply it to two protein superfamilies in sufficient detail to elucidate substrate specificity and mechanism.

Associate Professor of Physics **Martin Guthold**, with Drs. Richard Loeser, Jr., and Scott Wood, WFBH, will study *Mechanotransduction in cartilage*. The project aims to determine how integrin receptor signals regulate chondrocytes, or cartilage cells, to promote cartilage destruction in osteoarthritis. The team will use two recently developed fluorescent probes in conjunction with atomic force microscopy (AFM), an effective way to apply compression to single chondrocytes, to determine the effects on chondrocyte sulfenic acid formation and JNK activation. Identifying how

mechanical and chemical signals work together to regulate JNK2 activities will be a first in chondrocyte biology and possibly inform OA therapies targeting redox sites.

Assistant Professors of Mathematics **Sarah Mason** and Elizabeth Niese, Marshall University, will collaborate on *Symmetric functions and their corresponding diagrams*. Three projects, drawing on the co-investigators' different perspectives, will make contributions to knowledge on algebra and combinatorics, which seeks patterns in abstract phenomena and concrete ways to represent them.

William L. Poteat Professor of Chemistry **Mark Welker**, with Associate Professor of Physics **Freddie Salsbury**, and Associate Professor of Cancer Biology George Kulik, WFBH, are investigating *Prostate-targeted PI3K inhibitors*. PI3K is a family of enzymes involved in cellular growth, proliferation, differentiation, motility, survival, intracellular trafficking and, hence, cancer. This group was the first to demonstrate that PI3K inhibitors could be converted into prostate-selective pro-drugs, or medications that are converted to their active form by prostate specific antigen (PSA). Currently, no tissue-specific PI3K inhibitors are available, so, if successful, the work may lead to new therapeutic applications that will extend the survival of prostate cancer patients.





ORSP provides administrative support to the Institutional Review Board (IRB) under 45CFR §46. Pam Moser, Associate Director for Faculty Research Compliance and Support, maintains IRB records; facilitates communication between the IRB and researchers; coordinates meetings; updates and maintains the university's IRB policies and website; monitors training for researchers and other key personnel; provides continuing education for IRB members; and keeps the university's Federalwide Assurance (FWA) and IRB Registration current. As part of her responsibilities as Associate Director, Amy Comer is also an IRB Administrator, reviewing applications, monitoring training for researchers, and providing critical cross-coverage.

In 2012-2013, the IRB reviewed 166 new applications, a 6.4 percent increase over 2011-2012. One study was reviewed by the full board; 135 qualified for expedited review and 30 as exempt research. In addition, 167 amendments (up 56 percent), 124 continuing reviews (up 97%), and 7 safety events (minor protocol deviations) were processed. The increase in continuing review, amendment, and safety-event submissions indicates improved compliance with human subjects regulations and IRB policy. Two unanticipated problems were reported, and the two studies were suspended.

Group outreach efforts targeted graduate programs in Psychology, Communication, and Education and undergraduate URECA Scholars/Fellows and students in Political Science. Training and support for eIRB, the electronic submission and review system, continued for individual users across campus.

ORSP continued its oversight of potential financial conflicts of interest involving WFU research faculty. The Wake Forest University Reynolda Policy on Conflicts of Interest was revised to comply with the Final Rule for Financial Conflict of Interest in Public Health Services-funded research (42CFR§50 and 45CFR§94) and was implemented on August 24, 2012.



# Funding Highlights

Wake Forest University researchers brought in over \$9.8 million from external sponsors, not including fellowship support for scholarship in the social sciences and humanities. Overall, they submitted 152 proposals, requesting over \$38 million.

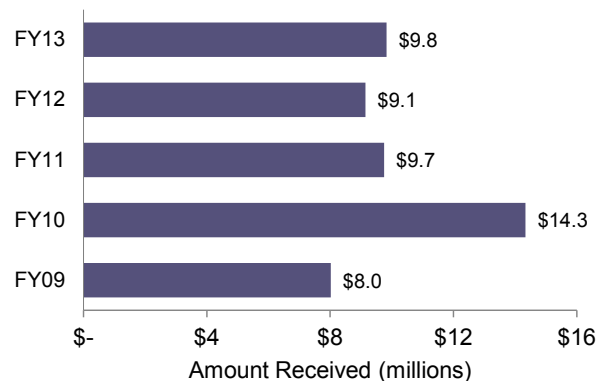
Faculty in Health and Exercise Science received the most funding again this year, surpassing last year by more than \$600K. The Physics faculty received the next highest number of awards, and their value increased by more than \$300K. The Chemistry Department submitted the most proposals and requested the most funding. More than half of departments receiving awards increased their totals over last year.

The following faculty and staff received their first individual external grants at WFU in FY13:

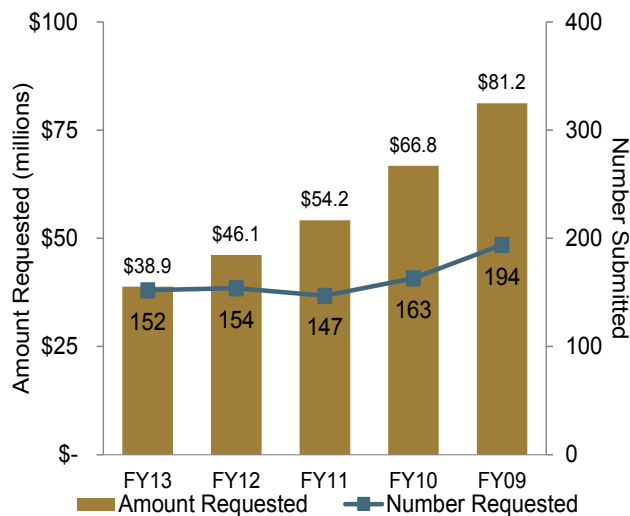
- Steven Folmar, Anthropology
- Rebecca Powell, Biology and the Center for Energy, Environment & Sustainability
- Alessandra Beasley Von Burg, Communication
- Ronald Von Burg, Communication
- Sam Cho, Computer Science and Physics
- John Senior, Divinity
- David Taylor, International Studies
- Sarah Raynor, Mathematics
- Megan Mulder, ZSR Library

In addition, a graduate of the CRADLE program, Assistant Professor of Chemistry Lindsay Comstock-Ferguson, received her first independent federal funding.

## AWARDS BY YEAR: 2009-2013



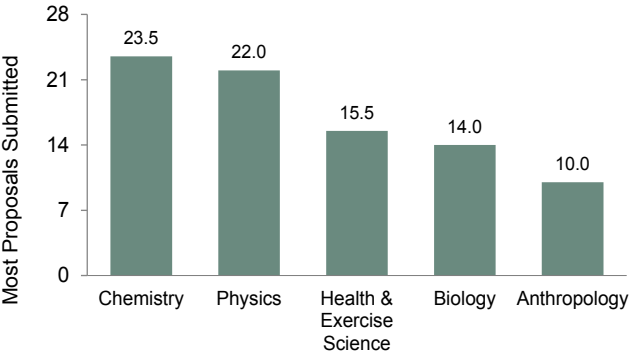
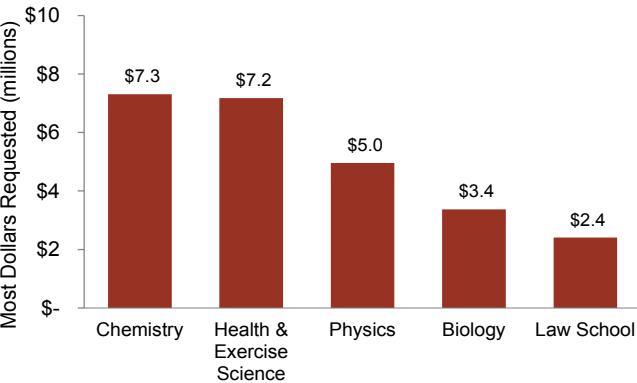
## PROPOSALS BY YEAR: 2009-2013



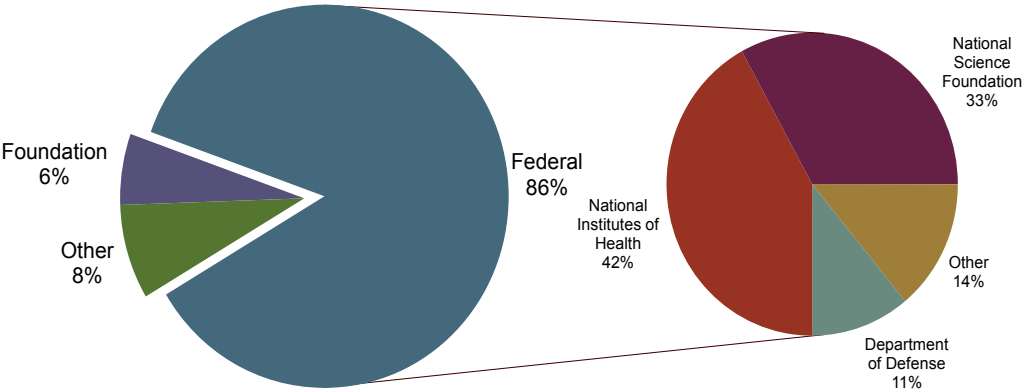
*These statistics summarize Reynolda campus sponsored research activity for FY13. The graphs include funding processed through the Office of Research and Sponsored Programs and not gifts or the many fellowship awards made to individual faculty. Awards represent authorization to spend as opposed to research expenditures.*



# PROPOSALS BY DEPARTMENT



# FUNDING SOURCES



Department/Center	Awards	Amount
Health & Exercise Science	18	\$2,760,989
Physics	27.5	\$2,472,552
Biology	11.5	\$727,894
Chemistry	6	\$673,972
Computer Science	6	\$586,078
Philosophy	1	\$417,759
Psychology	5	\$344,096
Center for Nanotechnology & Molecular Materials	2	\$296,343
Center for Energy, Environment & Sustainability	3.5	\$248,466
Humanities Institute	2	\$235,000
Communication	2	\$227,000
Anthropology	3	\$203,277
Translational Science Center	1	\$176,334
Graduate School	2	\$172,500
Mathematics	5.5	\$124,458
Politics & International Affairs	2	\$51,980
Divinity School	3	\$54,500
Economics	1	\$21,500
Magnolia Scholars	1	\$19,000
Business Schools	2	\$8,500
ZSR Library	1	\$5,081
Center for International Studies	1	\$2,000



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