



Center for Biomedical Research
Annual Report 2016-2017
Bradley J. Roth, Director
June 30, 2017

Introduction

“It was the best of times, it was the worst of times.” This year biomedical researchers at Oakland University accomplished much, but storm clouds loom on the horizon. Young faculty members obtained large external grants, and the achievements of our students impress and inspire us. Yet rumors of budget cuts to the National Institutes of Health, including reductions to indirect cost payments, portend hard times ahead. My goal is to employ the resources of the Center for Biomedical Research to exploit opportunities and face challenges. I am cautiously optimistic.

Budget

This table lists how the CBR spent its funds:

• Research Excellence Fund awards	146,000
• Graduate student stipends	85,558
• Shared resources	37,415
• Director stipend	25,550
• SUPER	18,000
• Graduate student tuition	16,661
• Sigma Xi travel	1,981
• Chemistry travel	500
• CBR festival	328
• WISE@OU/CBR events	318
• Microscopy meeting support	245
• CAS theme breakfast	45
Total	\$332,601

This money comes from the \$270,289 Research Excellence Fund, the \$58,654 CBR operating account, and the recovery of \$2063 from previously allocated but unused funds (total of \$331,006). In addition, the CBR gift account holds \$36,211 and serves as a strategic reserve. As always, Assistant Dean Laura Culbert of the College of Arts and Sciences and Sally Daniel of the Department of Physics helped me monitor and administer this money. Without them, I would be lost.

REF Awards

The Research Excellence Fund awards for 2016-2017 are:

<u>Faculty member</u>	<u>Department</u>	<u>Amount</u>
Arik Dvir	Biol	20,000
Chhabi Govind	Biol	10,000
Zijuan Liu	Biol	20,000
Mi-Hye Song	Biol	18,000
Ferman Chavez	Chem	18,000
Nessan Kerrigan	Chem	15,000
Senela Martic	Chem	18,000
Michael Sevilla	Chem	15,000
Colin Wu	Chem	12,000
Total		\$146,000

The REF awards account for 44% of the CBR budget. The purpose of these awards is to catalyze external proposals to agencies such as the National Institutes of Health. I thank Roman Dembinski (Dept Chemistry), Amy Banes-Berceli (Dept Biological Sciences), and Dao Qi Zhang (Eye Research Institute) for assisting with the review of the REF applications.

Graduate Student Support

The CBR supports graduate students in three PhD programs: Biological and Biomedical Sciences, Health and Environmental Chemistry, and Medical Physics. This year, the CBR spent \$85,558 for stipends and \$16,661 for tuition, representing 31% of the CBR budget. Additional tuition was provided by the Graduate Research Assistantship Tuition (GRAT) program.

<u>Student</u>	<u>Department</u>	<u>Mentor</u>	<u>Publications</u>
Daniel Mittelstaedt	Physics (fall)	Yang Xia	Mittelstaedt D, Kahn D, Xia Y (2016) Topographical and depth-dependent glycosaminoglycan concentration in canine medial tibial cartilage 3 weeks after anterior cruciate ligament transection surgery: A microscopic imaging study. <i>Quant Imag Med Surg</i> , 6 :648-660.
Syeda Batool	Physics (winter)	Yang Xia	
Kharananda Sharma	Physics	Brad Roth	Sharma K, Roth BJ (2017) A multiscale mechanical bidomain model of cardiac tissue with complex fiber geometry. 5 th International Conference on Computational and Mathematical Biomedical Engineering, April 10-12, Pittsburg.
Lu Lin	Chemistry	Xiangqun Zeng	Tang YA, Lin L, Kumar A, Guo M, Sevilla M, Zeng XQ (2017) Hydrogen electrooxidation in ionic liquids catalyzed by the NTf ₂ radical. <i>J Phys Chem C</i> , 121 :5161-5167.

Nicholas Peraino	Chemistry	Nessan Kerrigan	Chen S, Ibrahim AA, Peraino NJ, Nalla D, Mondal M, Van Raaphorst M, Kerrigan NJ (2016) Catalytic asymmetric synthesis of ketene heterodimer beta-lactones: Scope and limitations. <i>J Organic Chem</i> , 81:7824-7837. Peraino NJ, Kaster SH, Wheeler KA, Kerrigan NJ (2017) Asymmetric synthesis of gamma-lactones through koga amine-controlled addition of enediolates to alpha,beta-unsaturated sulfoxonium salts. <i>J Organic Chem</i> , 82:606-615.
Christina McKee	Biological Sciences	Rasul Chaudhry	McKee C, Hong YF, Yao DG, Chaudhry GR (2017) Compression induced chondrogenic differentiation of embryonic stem cells in three-dimensional polydimethylsiloxane scaffolds. <i>Tissue Eng A</i> , 23:426-435. Beeravolu N, McKee C, Alamri A, Mikhael S, Brown C, Perez-Cruet M, Chaudhry GR (2017) Isolation and characterization of mesenchymal stromal cells from human umbilical cord and fetal placenta. <i>JOVE</i> , e55224.
Suraj Timilsina	Biological Sciences	Luis Villa-Diaz	

Shared Resources

The CBR budget supports shared resources to improve the environment at OU for all biomedical researchers. This year the shared resources include:

- \$10,000 for a Retch Mixer Mill 400 to disrupt flash-frozen cells
- \$7667 for a new biosafety cabinet
- \$6232 for a magnetic resonance imaging probe in the Bennett NMR facility
- \$5875 for a Chemistry NMR instrument upgrade
- \$4997 for the maintenance contract for the ERI electron microscope
- \$2644 for gasses and recertification of existing biosafety cabinets

Other Budget Items

The CBR provided \$18,000 to support the Eye Research Institute's Summer Undergraduate Program in Eye Research (SUPER). The 2016 cohort included Maria Donovan, Reham Karana, Regan Miller, Anthony Premceski, Maya Sammane, and Adam Seidel.

Fifteen OU students presented at the 2016 Sigma Xi Student Research Conference in Atlanta, Georgia. The CBR supported the travel costs of one student and the registration fee of two (\$1981). Medical Physics PhD student Afua Dankwa won an award from Sigma Xi for her research in medical imaging.

The CBR continued to work with the Women in Science and Engineering at Oakland University (WISE@OU) program to mentor and support new faculty, and paid for one of the fall faculty luncheons (\$318). WISE@OU is transforming into WISER@OU, with the extra R indicating that the program will be administered by OU's Research Office. WISE@OU program assistant Leanne DeVreugd will work with Associate Vice President for Research David Stone to maintain and expand mentoring for young investigators. I participated in several WISE@OU activities, such as leading a workshop about best practices in mentoring

undergraduate researchers, serving on a search committee for a research development officer, participating in a summer writing group focusing on grant writing, and assisting in a new program called the PI Academy created by David Stone to help young faculty build careers and obtain external grants.

The CBR and the OU chapter of Sigma Xi organized the annual research festival (\$328), held March 21 in Gold Room B of Oakland Center. Students presented fourteen posters. Because the OU Graduate Research Conference was at about the same time, the festival was scaled back this year, with no best-poster competition. Nevertheless, the festival was a success with much discussion between students and faculty. Following it was the annual Sigma Xi lecture by Dr. L. Curtis Hannah, who spoke about Genetically Engineered Corn: A Case for Genetically Modified Organisms in Worldwide Food Sustainability.

For the second year in a row, the Michigan Microscopy & Microanalysis Society held its annual meeting at Oakland University. The MMMS meeting was on November 3 in the Oakland Center. The CBR was a sponsor for the meeting and paid the registration fee for four students and one faculty member (\$245). Vickie Kimler, the laboratory manager of the Ocular Structure and Imaging Facility, was a principal organizer of the event.

The College of Arts and Sciences theme this year was “Unity in Diversity.” One activity associated with this theme was a visit by Dr. Anne Stone of Arizona State University, who spoke several times about evolutionary medicine. CBR member Fabia Battistuzzi of the Department of Biological Sciences organized the event. The CBR paid for a breakfast for Stone with three faculty members (\$45).

The CBR allocated \$500 to reimburse travel expenses for Research Assistant Professor Amit Adhikary, who collaborates with CBR member Mike Sevilla. This support was part of a package of bridge funding for Sevilla, who submitted a competitive renewal for his NIH grant that is in its 29th year.

The CBR could do more to support biomedical research at OU if it had more money. Anyone who wants to give to the CBR is welcome to donate through OU’s All University Fund Drive (fund number 30128). The president’s office matched past donations 50 cents to the dollar. Become a philanthroper!

CBR Activities

The CBR supports biomedical research and education by maintaining the CBR website (www.oakland.edu/cbr) and Facebook page (“Oakland University Center for Biomedical Research”). This year, the CBR also started a Twitter feed (@OaklandUniv_CBR). Many lectures, research opportunities for students, and research accomplishments are highlighted on Facebook and Twitter. Like and Follow the CBR!

This year three faculty members became CBR members. Fabia Battistuzzi of the Department of Biological Sciences joined the CBR after getting large NASA and NIH grants to study the evolution of infectious disease. Andrea Kozak and Scott Pickett, both of the Department of Psychology, also became CBR members after obtaining an NIH award to study weight gain risk in early college students. The CBR lost several members; Libin Rong (Dept Mathematics and Statistics), Shravan Chintala (Eye Research Institute), Patricia Wren (School of Health Sciences), and Nessian Kerrigan (Dept Chemistry) all left OU for other institutions. Kerrigan’s external grants will continue at OU although he will be taking a new faculty position in Ireland. His REF funds will be used to continue this research, and in

particular support his remaining students as they complete their degrees. Chintala's leftover REF funds from a previous year were returned to the CBR to further catalyze the research effort of new faculty. We hate to lose productive faculty and will miss them, but we wish them well in their new positions.

Randy Westrick (Dept Biological Sciences) and I organized a National Science Foundation Graduate Research Fellowship Program workshop on September 7 in the Oakland Center. Twenty undergraduate and graduate students learned about this prestigious award, and several applied.

The Honors College sponsored a day-long round table discussion about undergraduate research (October 21, Oak View Hall). CBR member Frank Giblin and I presented talks focusing on undergraduate research opportunities at OU.

Once again the CBR was in charge of selecting winners of the Michael P. and Elizabeth A. Kenny Merit Scholarship. This year the available funds increased, so we could award three \$7000 scholarships to undergraduates in the sciences: Mario Walid (a high-achieving freshman biology major taking part in the SUPER program in 2017), Linzi Hobbs (a biomedical sciences major working with Randy Westrick to study blood clotting), and Regan Miller (a biology major who worked with CBR member Ken Mitton in the 2016 SUPER program). The number of applicants increased this year, and the quality of these undergraduates amazes me. I thank Evan Trivedi (Dept Chemistry), Colin Wu (Dept Chemistry), Anushaya Mohapatra (Dept Math & Stat) and Wei Zhang (Dept Physics) for assisting in the selection of the winners.

I was PI on a proposal for undergraduate research funding submitted to the Beckman Scholars Program. Last year's proposal was not successful, but we are trying again.

Biomedical Research at Oakland University

Biomedical researchers and students at OU accomplished much this year. Below I list some highlights. More are on the CBR Facebook page.

- Distinguished Professor Michael Chopp, of the Department of Physics, was selected by the World Stroke Organization to receive the Barbro B. Johansson Award. The award of € 10,000 (about \$11,000) was presented at the biennial World Stroke Congress, held October 26-29, 2016 in Hyderabad, India.
- Kristin Landis-Piwowar, Assistant Professor of Biomedical Diagnostic and Therapeutic Sciences, was part of the American Society for Clinical Laboratory Science Voices Under 40 program, developed to honor ASCLS members who have shown exceptional commitment to the organization, the laboratory profession and their community early in their professional career.
- The CBR welcomes new leaders to OU: Dean Kevin Ball of the School of Health Sciences, Dean Judy Didion of the School of Nursing, and Associate Vice President for Research David Stone.
- CBR member Tamara Hew-Butler was the first presenter at the new Soundings Series (April 18, Elliot Hall) organized by the Office of Research. The goal of this series is to showcase the work of OU's engaged researchers and explain how you too can become a publicly engaged scholar.

- The College of Arts and Sciences awarded biochemistry major Megan Kaster the Meritorious Achievement Award at the April 2017 commencement. Kaster worked with Assistant Professor Evan Trivedi (Dept Chemistry) to study fluorinated phthalocyanines for medical imaging.
- Oakland University recognized four members of the Center for Biomedical Research at the 22nd Annual Faculty Recognition Luncheon on April 19. Honorees included 1) Andrea Kozak of the Department of Psychology, 2) Andrew Goldberg of the Eye Research Institute, 3) Fabia Battistuzzi of the Department of Biological Sciences, who won the New Investigator Research Excellence Award, and 4) Yang Xia of the Department of Physics, who was appointed Distinguished Professor. Battistuzzi could not attend the luncheon and I accepted the award on her behalf, which elicited several wisecracks.

The CBR provides seed money for external grant proposals, particularly proposals to the National Institutes of Health. This year, several new biomedical grants were awarded:

- CBR member Fabia Battistuzzi (Dept Biological Sciences) received a \$417,286 NIH award to study the evolution of pathogenicity. In addition, she received a \$581,213 award from NASA to reconstruct the chronology of life using molecular dating methods.
- Randy Westrick (Dept Biological Sciences) was awarded a NIH grant for \$433,481 to study the identification of genetic regulators of blood clotting.
- CBR members Andea Kozak and Scott Pickett (both of the Dept Psychology) obtained a \$426,251 NIH grant to study weight gain in college students.

Other new awards related to biomedical research include






























- Martha Escobar (Dept Psychology) received several grants from the National Science Foundation to support science, technology, engineering, and mathematics (STEM) education.
- David Szlag (Dept Chemistry) got \$158,314 from the Michigan Department of Environmental Quality to develop methods to monitor cyanobacteria, which produce toxins harmful to humans.
- Thomas Raffel (Dept Biological Sciences) obtained a prestigious CAREER award from NSF to study how temperature affects parasite-host interactions.

In addition to these new awards, many CBR members having continuing NIH funding (the Appendix lists active NIH grants having an OU Principal Investigator).

Finally, the CBR welcomes the newest biomedical researcher to Oakland University: President Ora Hirsch Pescovitz. Both Pescovitz and outgoing President George Hynd have distinguished research records. OU is lucky to have leaders who understand the opportunities, challenges, and importance of biomedical research.

Brad Roth

Appendix
Active Grants Listed on the National Institutes of Health Reporter Website
(<http://projectreporter.nih.gov/reporter.cfm>), June 30, 2017.

	T	Act	Project	Year	Sub #	Project Title	Contact PI/ Project Leader	Organization	FY	Admin IC	Funding IC	FY Total Cost by IC	Similar Projects
	1	R15	GM121981	01		UNDERSTANDING THE EVOLUTION OF PATHOGENICITY WITH A GENOME COMPLEXITY APPROACH	BATTISTUZZI, FABIA U	OAKLAND UNIVERSITY	2016	NIGMS	NIGMS	\$417,286	
	1	R15	GM112395	01A1		MECHANISTIC STUDIES ON BIOREMEDIATION METALLOENZYMES	CHAVEZ, FERMAN ALBERT	OAKLAND UNIVERSITY	2015	NIGMS	NIGMS	\$334,168	
	7	R15	CA169994	02		A PILOT STUDY OF YOGA FOR BREATHING AND QUALITY OF LIFE OF LUNG CANCER PATIENTS	FOULADBAKSH, JUDITH MARIE	OAKLAND UNIVERSITY	2013	NCI	NCI	\$213,003	
	5	R01	EY002027	38		PROTEINS OF NORMAL AND CATARACTOUS LENSES	GIBLIN, FRANK JOSEPH	OAKLAND UNIVERSITY	2016	NEI	NEI	\$375,560	
	5	R01	EY025291	02		INVESTIGATION OF THE MOLECULAR BASIS OF ROD AND CONE PHOTORECEPTOR STRUCTURE	GOLDBERG, ANDREW FX	OAKLAND UNIVERSITY	2017	NEI	NEI	\$375,837	
	5	R01	GM095514	05		MECHANISMS OF RSC RECRUITMENT AND ITS ROLE IN TRANSCRIPTION	GOVIND, CHHABI KUMAR	OAKLAND UNIVERSITY	2015	NIGMS	NIGMS	\$275,656	
	1	R15	GM107800	01A1		CATALYTIC ASYMMETRIC SYNTHESIS OF DEOXYPROPIONATES FROM KETENES	KERRIGAN, NESSAN JOSEPH	OAKLAND UNIVERSITY	2014	NIGMS	NIGMS	\$333,587	
	1	R15	HL130955	01A1		EXAMINATION OF HABITUAL SLEEP TRAJECTORIES ACROSS THE FIRST TWO YEARS OF COLLEGE: RELATION TO WEIGHT GAIN RISK BEHAVIORS AND OUTCOMES	KOZAK, ANDREA T.	OAKLAND UNIVERSITY	2016	NHLBI	NHLBI	\$426,251	
	1	R15	CA182889	01		ENDOTHELIAL CELL ACTIVATION REGULATES AML GROWTH AND RELAPSE	MADLAMBAYAN, GERARD JAMES	OAKLAND UNIVERSITY	2014	NCI	NCI	\$429,874	
	1	R15	GM119053	01		MECHANISTIC STUDIES OF ANTI-TAU ANTIBODIES EFFECTS ON TAU BIOCHEMISTRY	MARTIC, SANELA	OAKLAND UNIVERSITY	2016	NIGMS	NIGMS	\$433,433	
	1	R15	EY025089	01A1		VEGF'S LONGITUDINAL EFFECT ON THE RETINA AND RETINAL VASCULATURE IN VIVO	MITTON, KENNETH PATRICK	OAKLAND UNIVERSITY	2016	NEI	NEI	\$448,500	
	4	R01	CA045424	29		MECHANISMS FOR RADIATION DAMAGE TO DNA: LET EFFECTS	SEVILLA, MICHAEL DOUGLAS	OAKLAND UNIVERSITY	2016	NCI	NCI	\$203,672	
	1	R15	HL133907	01		IDENTIFICATION OF THE GENETIC REGULATORS OF PLASMINOGEN ACTIVATOR INHIBITOR-1	WESTRICK, RANDAL J	OAKLAND UNIVERSITY	2016	NHLBI	NHLBI	\$433,481	
	5	R01	AR069047	02		ACL DEFICIENCY MODIFIES TOPOGRAPHICAL DEGRADATION IN POSTTRAUMATIC OSTEOARTHRITIS	XIA, YANG	OAKLAND UNIVERSITY	2017	NIAMS	NIAMS	\$443,531	
	5	R01	EY022640	04		FUNCTIONAL ORGANIZATION OF THE RETINAL DOPAMINERGIC NETWORK	ZHANG, DAO-QI	OAKLAND UNIVERSITY	2017	NEI	NEI	\$375,000	