

Annual Report

Department of Physics

2013 - 2014

Department of Physics

2013 – 2014

FACULTY

Chairperson: Andrei Slavin

Professors emeriti: Abraham R. Liboff, John M. McKinley, Ralph C. Mobley, Norman Tepley, Paul A. Tipler, W.D. Wallace, Robert M. Williamson

Distinguished professors: Michael Chopp, Andrei Slavin, Gopalan Srinivasan

Professors: Ken Elder, David Garfinkle, George Martins, Bradley J. Roth, Yang Xia

Associate professors: Kapila Clara Castoldi, Evgeniy Khain, Alberto Rojo

Assistant professors: Yuejian Wang

Research associate professor: Vasyl Tyberkevych

Adjunct professors: Carl Bleil, James R. Ewing, Grant R. Gerhart, Brian Marples, Hani Sabbah, Bryan Shumaker, Hamid Soltanian-Zadeh, Srinivasan Venkatesan, Uma Devi Venkateswaran, George Wilson, Di Yan

Adjunct associate professors: Robert L. Hammond, Quan Jiang, Robert A. Knight, Jian Liang, Patrick N. McDermott

Adjunct assistant professors: Hassan Bagher-Ebadian, Susan M. Bowyer, Benjamin Buller, Dan Ionascu, Kenneth Jenrow, Tiezhi Zhang, Zheng-Gang Zhang

Special Lecturer: Eugene Surdutovich

Lecturers: Rao Bidthanapally, Sally K. Daniel, Steffan Puwal, Jyothi Raman

Chief adviser: George Martins

STAFF

Rao Bidthanapally, **Instrumentation Specialist**
Dominic Crea, **Laboratory Technician**
Sally K. Daniel, **Laboratory Manager**
Jonathan Schemke, **Laboratory Technician Assistant**
Carol Searight, **Administrative Secretary**

Courses Offered: May 2013- April 2014

Summer 2013, Part I

<u>Course</u>	<u>Title</u>	<u>Enroll</u>
PHY 101	General Physics I	23
PHY 101	General Physics I	113
PHY 102	General Physics II	59
PHY 106	Earth Sci/Phy Geo	40
GEO 106	Earth Sci/Phy Geo	4
PHY 151	Intro. Physics I	81
PHY 158	General Physics Lab	32
PHY 158	General Physics Lab	30
PHY 158	General Physics Lab	33
PHY 158	General Physics Lab	33
PHY 290	Intro. To Research	1
PHY 307	Geophysics	8
PHY 490	Independent Research	1
PHY 790	Doctoral Research	1

Summer 2013, Part II

<u>Course</u>	<u>Title</u>	<u>Enroll</u>
PHY 102	General Physics II	112
PHY 152	Intro. Physics II	101
PHY 158	General Physics Lab	36
PHY 158	General Physics Lab	25
PHY 158	General Physics Lab	31
PHY 158	General Physics Lab	37
PHY 490	Independent Research	1

Fall 2013

<u>Course</u>	<u>Title</u>	<u>Enroll</u>	<u>Course</u>	<u>Title</u>	<u>Enroll</u>
PHY 101	General Physics I	116	PHY 151	Intro. Physics Lab I	18
PHY 101	General Physics I	94	PHY 151	Intro. Physics Lab I	16
PHY 101	General Physics I	102	PHY 151	Intro. Physics Lab I	24
PHY 101	General Physics Lab I	48	PHY 151	Intro. Physics Lab I	13
PHY 101	General Physics Lab I	44	PHY 152	Intro. Physics II	59
PHY 101	General Physics Lab I	47	PHY 152	Intro. Physics Lab II	9
PHY 101	General Physics Lab I	50	PHY 152	Intro. Physics Lab II	9
PHY 101	General Physics Lab I	50	PHY 152	Intro. Physics Lab II	16
PHY 101	General Physics Lab I	38	PHY 152	Intro. Physics Lab II	8
PHY 101	General Physics Lab I	35	PHY 152	Intro. Physics Lab II	14
PHY 102	General Physics II	76	PHY 152	Intro. Physics Lab II	3
PHY 102	General Physics Lab II	16	PHY 161	Fund. Of Physics I	36
PHY 102	General Physics Lab II	15	PHY 161	Fund. Of Physics I	35
PHY 102	General Physics Lab II	14	PHY 162	Fund. Of Physics II	47
PHY 102	General Physics Lab II	15	PHY 317	Modern Physics Lab	14
PHY 102	General Physics Lab II	4	PHY 325	Biological Physics	9
PHY 102	General Physics Lab II	12	PHY 351	Int. Theoretical Phy.	16
PHY 104	Astronomy: Sol. Sys.	72	PHY 361	Mechanics I	15
PHY 106	Earth Sci/Phy Geo	48	PHY 371	Modern Physics	19
GEO 106	Earth Sci/Phy Geo	3	PHY 400	Undergrad. Seminar	1
PHY 108	Principles of Physics I	7	PHY 405	ST: Rad Terrorism	3
PHY 108	Principles of Physics I	4	PHY 421	Thermodynamics	6
PHY 108	Principles of Physics I	5	PHY 490	Independent Research	1
PHY 109	Principles of Phy. II	20	PHY 525	Radiation Biophysics	5
PHY 110	General Physics Lab I	17	PHY 552	Theoretical Physics	6
PHY 111	General Physics Lab II	3	PHY 583	Classical Electrodyn.	3
PHY 120	Phy. Everyday Life	24	PHY 600	Seminar	1
PHY 151	Intro. Physics I	63	PHY 690	Master of Science Res	1
PHY 151	Intro. Physics I	68	PHY 790	Doctoral Research	10
PHY 151	Intro. Physics Lab I	18	SCI 100	Phy. Sci. in Life	24
PHY 151	Intro. Physics Lab I	28			
PHY 151	Intro. Physics Lab I	15			

Winter 2014

<u>Course</u>	<u>Title</u>	<u>Enroll</u>	<u>Course</u>	<u>Title</u>	<u>Enroll</u>
PHY 101	General Physics I	112	PHY 151	Intro. Physics Lab I	33
PHY 101	General Physics I	55	PHY 151	Intro. Physics Lab I	39
PHY 101	General Physics Lab I	26	PHY 152	Intro. Physics II	83
PHY 101	General Physics Lab I	33	PHY 152	Intro. Physics Lab II	10
PHY 101	General Physics Lab I	31	PHY 152	Intro. Physics Lab II	11
PHY 101	General Physics Lab I	22	PHY 152	Intro. Physics Lab II	9
PHY 102	General Physics II	115	PHY 152	Intro. Physics Lab II	11
PHY 102	General Physics II	115	PHY 152	Intro. Physics Lab II	7
PHY 102	General Physics Lab II	25	PHY 152	Intro. Physics Lab II	3
PHY 102	General Physics Lab II	23	PHY 152	Intro. Physics Lab II	9
PHY 102	General Physics Lab II	25	PHY 152	Intro. Physics Lab II	12
PHY 102	General Physics Lab II	23	PHY 152	Intro. Physics Lab II	11
PHY 102	General Physics Lab II	25	PHY 161	Fund. Of Physics I	46
PHY 102	General Physics Lab II	25	PHY 162	Fund. Of Physics II	76
PHY 102	General Physics Lab II	27	PHY 331	Optics	14
PHY 102	General Physics Lab II	15	PHY 381	Electricity/Magn. I	12
PHY 102	General Physics Lab II	20	PHY 400	Undergrad. Seminar	1
PHY 102	General Physics Lab II	22	PHY 418	Modern Optics Lab	4
PHY 105	Astronomy: Stars	64	PHY 472	Quantum Mech. I	10
PHY 106	Earth Sci/Phy Geo	58	PHY 490	Independent Research	2
PHY 108	Principles of Physics I	15	PHY 535	Modeling Compl. Sys.	5
PHY 109	Principles of Phy. II	20	PHY 574	Intro. To Solid State	3
PHY 109	Principles of Phy. II	20	PHY 673	Quantum Mechanics	2
PHY 110	General Physics Lab I	15	PHY 690	Master of Science	1
PHY 111	General Physics Lab II	14	PHY 790	Doctoral Research	12
PHY 120	Phy. Everyday Life	25	SCI 100	Phy. Sci. in Life	46
PHY 151	Intro. Physics I	117	HC 208	Historical Geology	11
PHY 151	Intro. Physics Lab I	33			
PHY 151	Intro. Physics Lab I	15			

Graduates

June 2013

Madhava Prasad Aryal, Ph.D., biomedical sciences: medical physics

Lisa A. Block, B.A., physics

James Alexander Dehaan, B.A., physics

December 2013

Chloe Alysse Akers, B.S., physics

Sean Patrick Kennedy, B.A., physics, *awarded departmental honors*

Kate Lopez, B.S., physics

April 2014

Jarrett M. Berry, B.S., physics

Erik Joseph-Leonard Courter, B.S., medical physics, *awarded departmental honors*

David Christopher Gallagher, M.S., physics

Melvin Robert Kucway III, B.S., medical physics

Kyle Thomas Omell, B.A., physics secondary education/prof

Daniela Michelle Osorio, B.A., physics

Matthew R. Solt, B.S., physics, *awarded departmental honors*

Gregory M Wullaert, M.S., physics

Graduate Students Enrolled as of April 2014

Ph.D. – Biomedical Sciences/Medical Physics

Farid Badar
Nicholas Charteris
Afua Dankwa
Rasha Elmghirbi
Suran Galappaththige
David Kahn
Sunil Kandel
Ji Hyun Lee
Christopher Martin
Daniel Mittelstaedt
Hoda Sharifi
Kharananda Sharma
Ranjeeta Thapa
Poornima Venkat

M.S. – Physics

Ali Dirul-Islam
David Gallagher
Steven Louis
Yeonjeong Son

Executive Summary

In the year 2013-2014, the Physics Department had the following enrollment figures:

- (i) **62** undergraduate physics majors;
- (ii) **6** students in the Master's program;
- (iii) **14** students in the Medical Physics Ph.D. program.

For spring, summer, fall 2013 and winter 2014:

4,034 students enrolled in physics courses, over an 18% increase from previous year and over a 76% increase from five years ago.

11,849 delivered credits: 6,323 (full-time faculty) and 5,526 (part-timers)

NEW EXTERNAL GRANT FUNDING OBTAINED JULY 2013– JUNE 2014

Faculty	Grant Source	External Grant Expenditure
Roth	NIH	314,748.00
Slavin	TARDEC	50,000.00
Srinivasan	NSF-ECCS-EPMD	345,000.00
	NSF-MRI	165,000.00
	DARPA-STTR-Phase I	35,000
		Total = 545,000
		Grand Total: \$909,748

NOTES

The department hired Dr. Eugene Surdutovich as adjunct assistant professor beginning August 15, 2014.

Professor Emeritus John McKinley passed away on July 25, 2014. He was a professor in the Department of Physics from 1966-1992.

Bradley Roth: Served as Acting Chair, May 15 – August 15, 2013. Serves as Director of the Center for Biomedical Research since 1/1/2009.

Andrei Slavin: Serves as Chair of the Department of Physics since 8/15/2003.

HONORS

Michael Chopp: won the 2014 Abraham White Distinguished Science Award for his discovery of the role of a protein in the treatment of brain injuries and neurodegenerative diseases.

Ken Elder: recognized in the area of research at the 2014 Founder's Day luncheon.

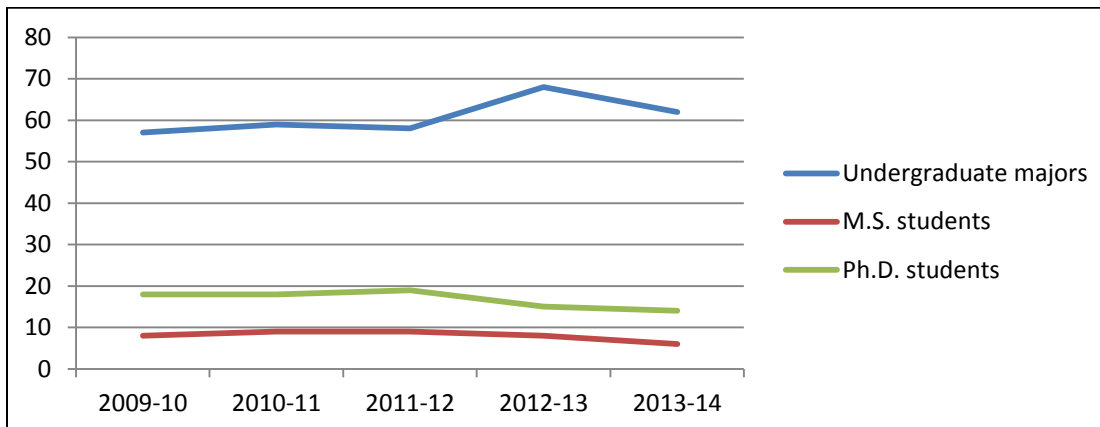
Evgeniy Khain: KITP scholar, 2012-2014, awarded December 14, 2011. The Kavli Institute for Theoretical Physics has established a program of visiting researchers in theoretical physics. The purpose of this program is to support the research efforts of faculty at U.S. colleges and universities that are not major research institutions. <http://www.kitp.ucsb.edu/for-scientists/fellowships/kitp-scholars>.

Alberto Rojo: Collaborating Member of ANLE (North American Academy of the Spanish Language), October 10, 2013.

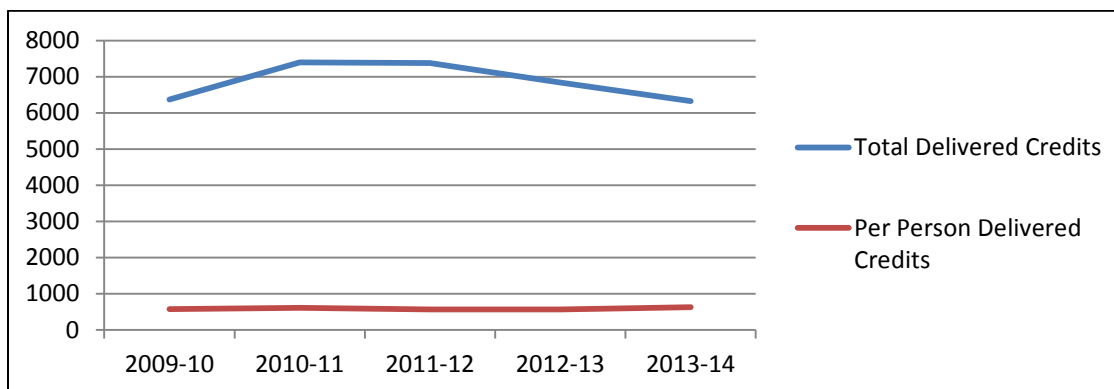
Andrei Slavin: MAINZ Visiting Professorship, Mainz, Germany, October 6, 2014.

Yuejian Wang: New Investigator Research Excellence Award, Oakland University, April 9, 2014.

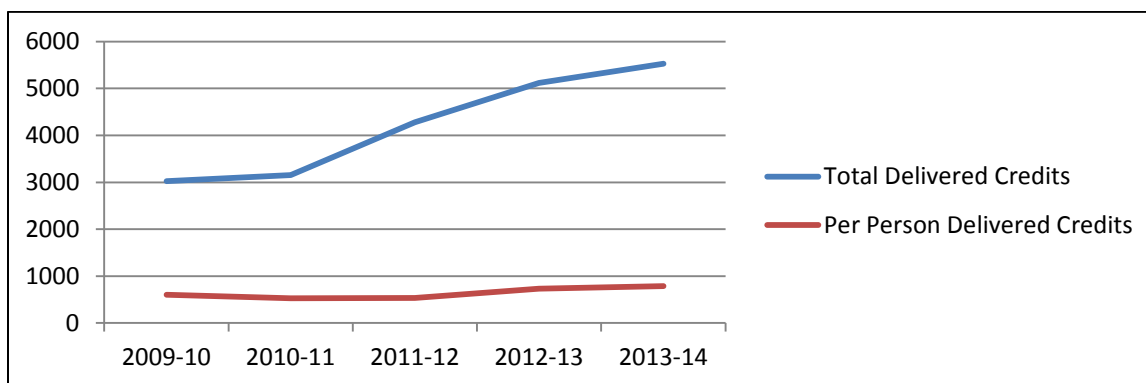
Physics Student Enrollment, 2009-2014



Full-time Faculty Delivered Credits, 2009-2014



Part-time Instructor Delivered Credits, 2009-2014



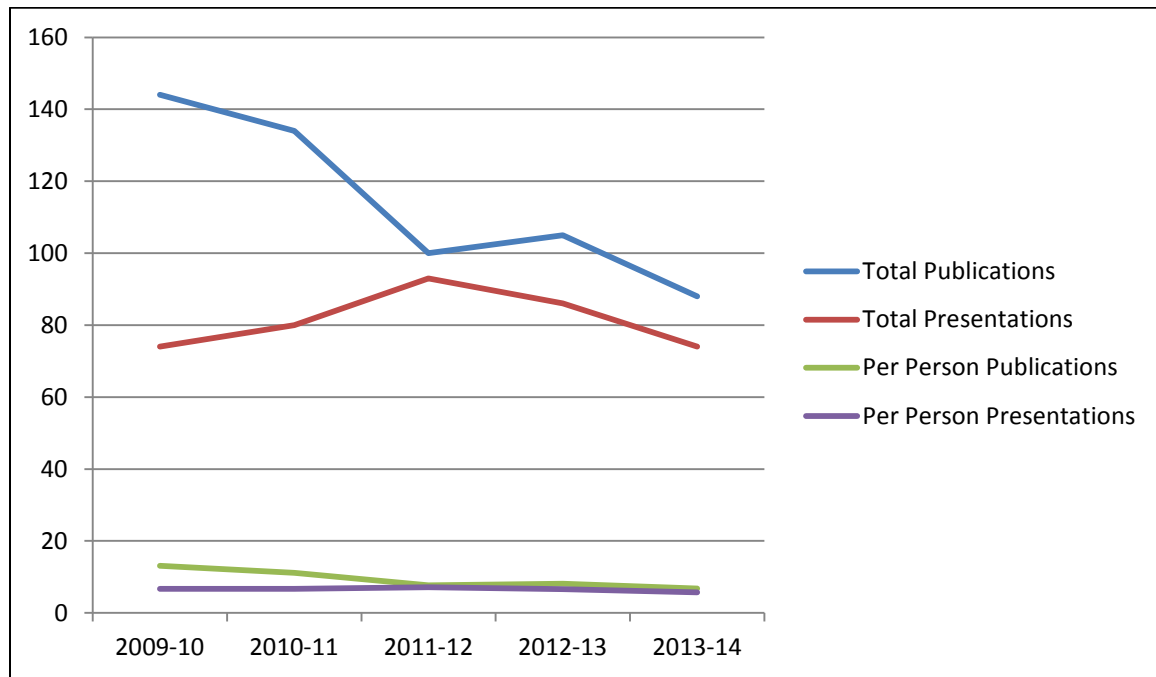
Teaching: Full-time Faculty

Faculty	# of Courses	# of Delivered Credits	# of Supervised Undergraduates	# of Supervised Graduates
Castoldi (excluding supervising labs)	8	2085		8 (TA's)
Chen, Jieli (Henry Ford Hospital)				1
Chopp				
Elder	3	96		
Ewing, James (Henry Ford Hospital)				1
Garfinkle – on sabbatical fa13 & wi14				
Khain	4	1234		1
Martins – on sabbatical fa13	2	777		
Rojo	4	248		
Roth – on sabbatical wi14	1	459	3	1
Slavin	4	79		
Srinivasan	18	17		
Tyberkevych – research prof.				
Wang	4	1300		
Wilson, George (Beaumont Hospital)				1
Xia	1	28	1	5
Totals	49	6,323	4	18

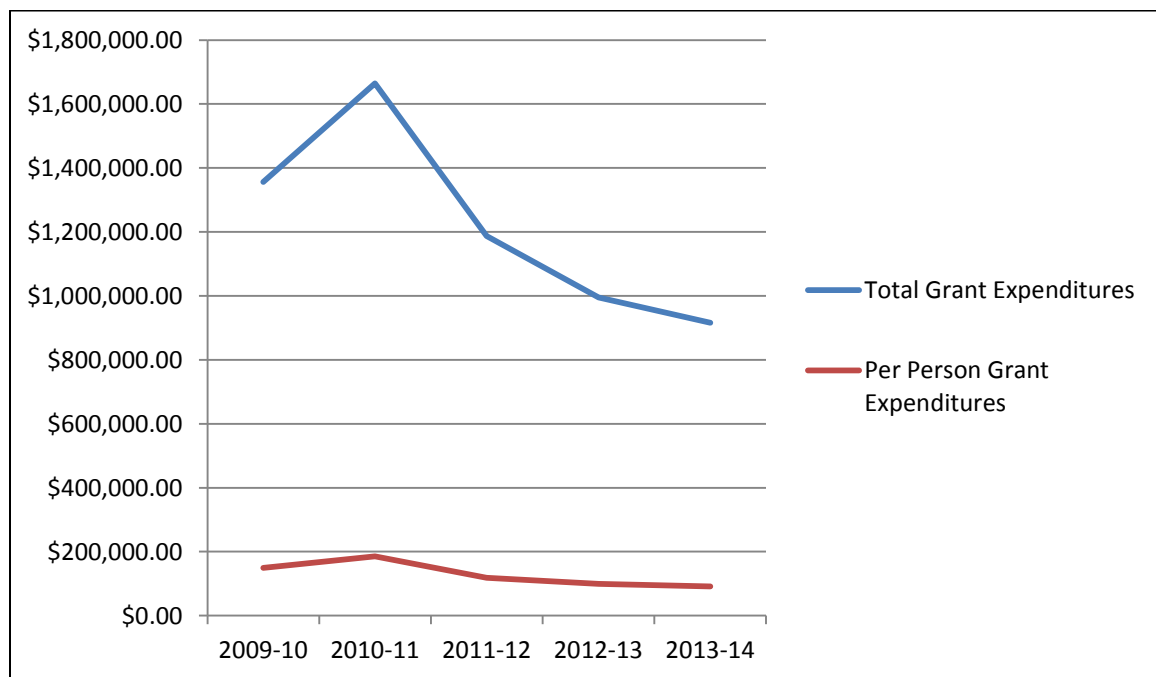
Teaching: Part-time Lecturers

Instructor	# of Courses	# of Delivered Credits
Bidthanapally	6	404
Bowyer	1	452
Crea	2	110
Daniel	1	486
Puwal	7	964
Raman	3	1,164
Surdutovich – special lecturer	6	1,946
Totals	26	5,526

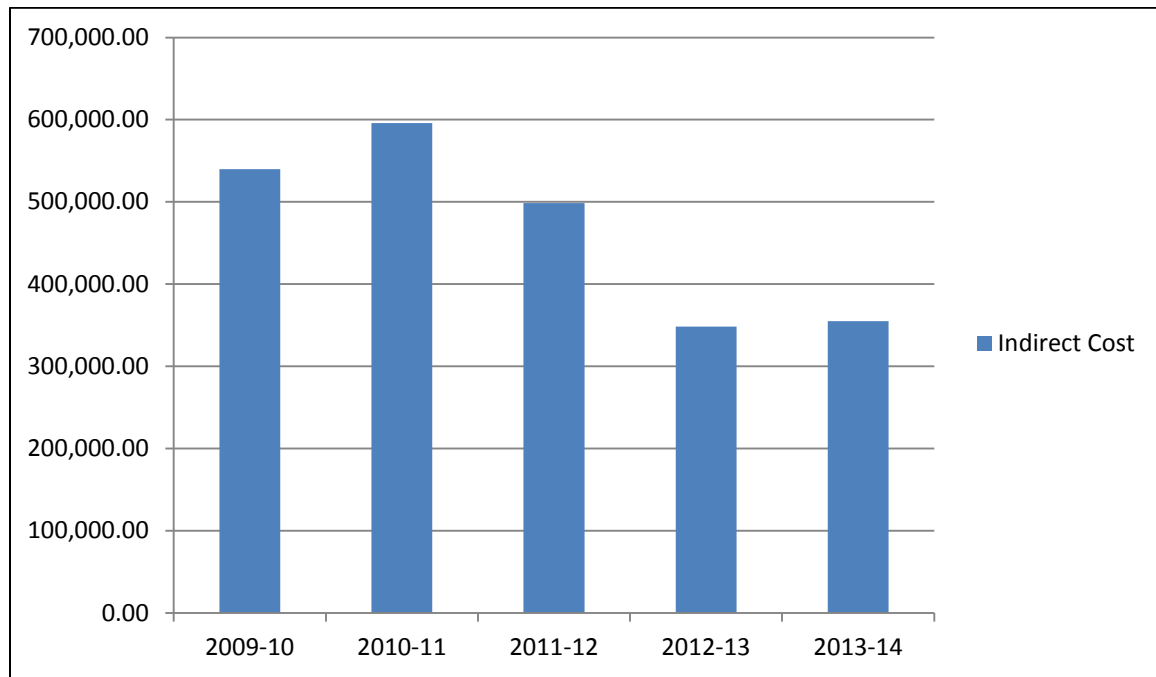
Research Productivity, 2009-2014



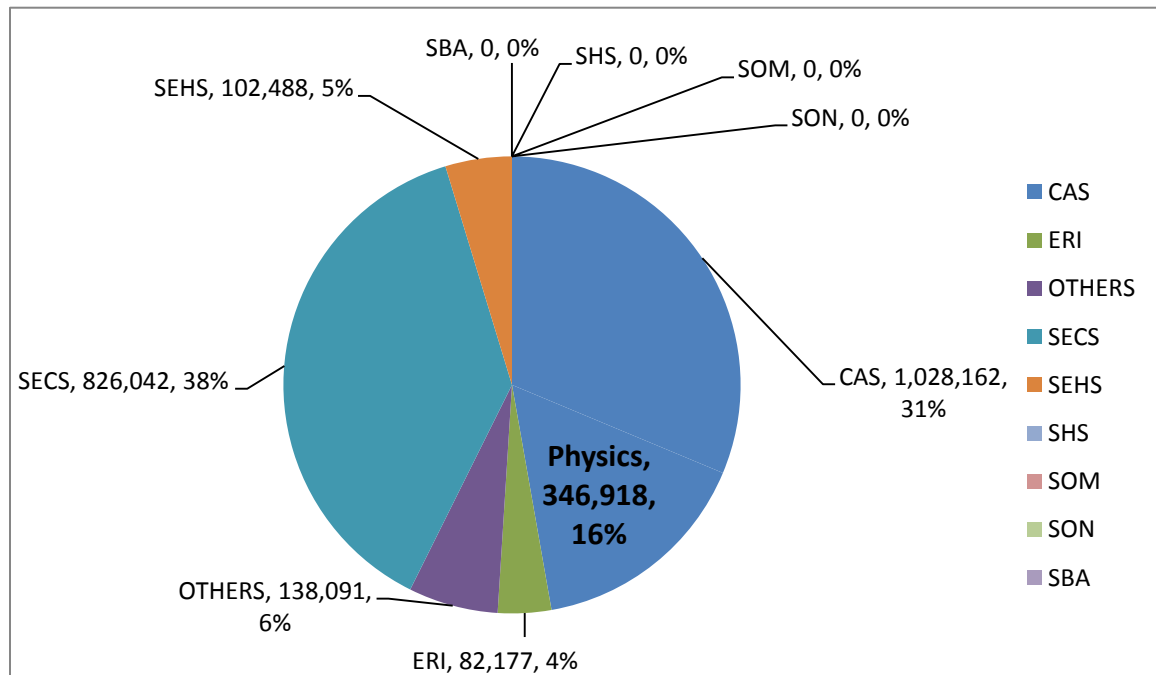
Total External Grant Expenditures, 2009-2014



Indirect Cost, 2009-2014



OU Grants – Indirect Cost, July 1, 2013 – June 30, 2014



Research Productivity

Faculty	External Grant Expenditures	Indirect Cost	# of Publications	# of Presentations
Castoldi-adjunct prof.				
Chopp			19	19
Elder			7	8
Garfinkle	31,985.54	15,353.06	5	5
Khain			1	4
Martins	50,971.29	19,884.61	2	0
Rojo			2	5
Roth	40,515.04	15,164.36	5	1
Slavin	292,430.83	138,499.76	14	23
Srinivasan	306,179.18	81,072.57	11	1
Surdutovich-special lecturer			3	2
Tyberkevych-research prof.			12	3
Wang			5	1
Xia	193,348.97	84,901.13	2	2
Totals	\$915,430.85	\$354,875.49	88	74

The Department of Physics continued to excel in teaching, research, and service during the 2013-2014 academic year.

In teaching, our total of over 11,849 delivered credits was at the same level as the previous year. Our new teaching laboratories that became an integral part of our undergraduate courses of Introductory Physics are functioning successfully under the constant supervision of Dr. Clara Castoldi and Prof. Gopalan Srinivasan. For the future development of these laboratories the Department urgently needs a full-time Laboratory Technician for the weekly setup of the labs and for the repair of damaged equipment.

We also need additional space situated near the Physics stockroom (rooms 113 and 123, HHS) to move the hands-on course PHY 120 - "Physics of Everyday Life" from its current location in the basement of the SEB.

In research, the department continued to excel in external funding, publications, and citations, but numbers are lower than the previous three years.

Unfortunately, the department's external research funding decreased for the second year in a row due to a very difficult situation in the funding of fundamental research in the country, in general. At the same time, the external research funding at the Physics Department still remained reasonably

high (bringing in 16% of the university's total indirect costs), led by Andrei Slavin, Yang Xia and Gopalan Srinivasan.

The total number of publications also went down to below 90 , but still remained high compared to other research units at Oakland University. The papers published by the members of the Physics Department were actively cited in literature, so that the total number of citations again exceeds 4000, according to the Web of Science.

The research efforts in the Department were supported by Research Associate Prof. Vasyl Tyberkevych, an expert in spintronics, and recently appointed Adjunct Professor Eugene Surdutovich, known for his work on ion-beam cancer therapy, as well as by many visitors and post-doctoral research associates from all over the world (China, Russia, Ukraine, Brazil, Germany, etc...).

The Physics Department was also active in service. Several members of the Department provided professional service as members of the Editorial Boards of the international research journals:

Prof. B. Roth: "Journal of Cardiovascular Electrophysiology and for Heart Rhythm".

Prof. D. Garfinkle: "Classical and Quantum Gravity" and "International Journal of Modern Physics D".

Prof. A. Slavin: "Scientific Reports (Nature)", and "IEEE Transactions on Magnetism".

Prof. Y. Wang: "Scientific Reports (Nature)".

Prof. M. Chopp: "Journal of Cerebral Blood Flow and Metabolism".

All members of the faculty continued to dedicate much of their time to reviewing grant proposals for agencies such as NSF and NIH, and refereeing articles for leading physics journals.