

Cell and Molecular Biology Graduate Program

Annual Report

July 1, 2011 to June 30, 2012

CMB is a graduate recruitment, admissions and degree conferring program. The Colorado State University Cell and Molecular Biology Graduate Program consists of faculty members from five colleges and 13 departments whose research programs focus on the molecular and cellular aspects of cancer biology, infectious disease, metabolism (includes biofuels), neuroscience, plant biology, molecular physiology, gene expression, reproductive biology, developmental biology and structural biology. Due to the broad range of well-funded research laboratories to work in, CMB attracts a large number of highly qualified applications each year. The current CMB student body consists of 14 MS and 60 PhD students conducting their research in laboratories of the CMB Faculty Members.

FACULTY

The excellence of the scholarly activities of the CMB Faculty has been acknowledged through many prestigious honors, awards, appointments and speaking invitations (CSU, national and international), journal editorial positions, leadership roles in scientific workshops, conferences and grant review panels and patent awards.

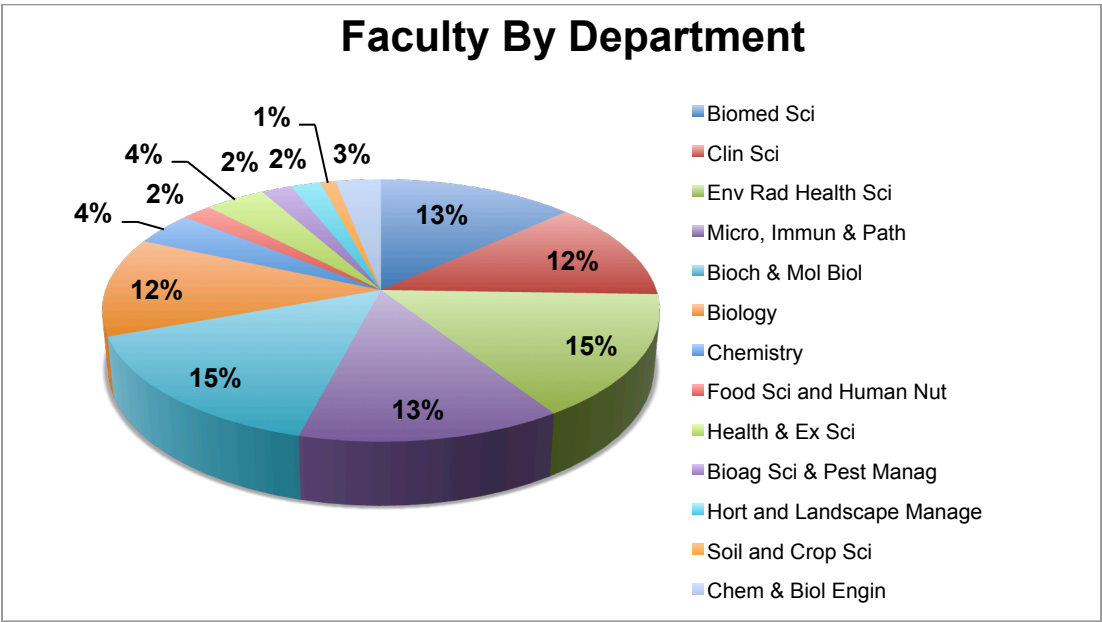
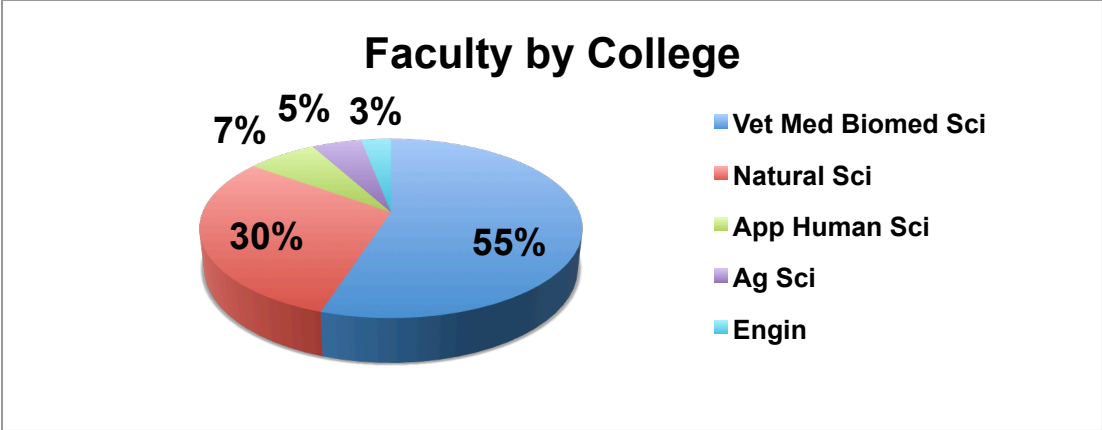
The faculty members in the CMB Graduate Program have garnered a wide array of prestigious CSU, national and international awards and honors through their careers as professors and scientists. Examples particularly worth noting are several Pew Scholars, an HHMI Investigator, CSU Monfort Professors, Pennock Service Awardees, Cermack Advising Awardees and College of Natural Sciences Professor Laureates. CMB faculty members are often invited to speak at other institutions in the U.S. and abroad, as well as at national and international scientific conferences. Most CMB faculty members serve as manuscript and grant application reviewers, often as editors and committee chairs. A large proportion of the CMB faculty members have leadership roles in scientific societies and as organizers of national and international scientific symposia. On average, CMB faculty members have published 17 journal articles and have been cited 232 times (9.4 times per article) since 2006. The CMB faculty members are well funded with an average of \$1,677,042 in funding per faculty member from 2006 to 2011, or \$335,409 per faculty per year. Finally, a large number of CMB faculty members collaborate with researchers from across the U.S. and the world. Similarly, they are able to attract postdoctoral fellows nationally and internationally.

The faculty membership of the Cell and Molecular Biology Graduate Program continues to expand and broaden into new areas as new faculty join various departments at CSU and then become faculty members in CMB. Last year, six new faculty members joined the CMB program increasing the total to 99 members. The faculty of the CMB program as of June 30, 2012, and their departmental affiliations are listed below:

<u>Name</u>	<u>Department</u>
Chris Ackerson	Chemistry
Ramesh Akkina	Microbiology, Immunology & Pathology
Kenneth Allen	Food Science & Human Nutrition
Gregory Amberg	Biomedical Sciences
Lorinda Anderson	Biology
Lucas Argueso	Environmental & Radiological Health Sciences
Susan Bailey	Environmental & Radiological Health Sciences
James Bamburg	Biochemistry & Molecular Biology
B. George Barias	Chemistry
Joel Bedford	Environmental & Radiological Health Sciences
Patricia Bedinger	Biology
Barbara Biller	Clinical Sciences
Gerrit Bouma	Biomedical Sciences
Mark Brown	Clinical Sciences
Daniel Bush	Biology
Chaoping Chen	Biochemistry & Molecular Biology
Adam Chicco	Health & Exercise Science

Name	Department
Stephen Chisholm	Bioagricultural Sciences & Pest Management
Colin Clay	Biomedical Sciences
Robert Cohen	Biochemistry & Molecular Biology
Debbie Crans	Chemistry
Norman Curthoys	Biochemistry & Molecular Biology
Jennifer DeLuca	Biochemistry & Molecular Biology
Santiago Di Pietro	Biochemistry & Molecular Biology
Steven Dow	Clinical Sciences
Dawn Duval	Clinical Sciences
Scott Earley	Biomedical Sciences
EJ Ehrhart	Microbiology, Immunology & Pathology
Nicole Ehrhart	Clinical Sciences
Gregory Florant	Biology
David Frisbie	Clinical Sciences
Deborah Garrity	Biology
Brian Geiss	Microbiology, Immunology & Pathology
Mercedes Gonzales-Juarrero	Microbiology, Immunology & Pathology
Daniel Gustafson	Clinical Sciences
Karyn Hamilton	Health & Exercise Sciences
William Hanneman	Environmental & Radiological Health Sciences
Jeffrey Hansen	Biochemistry & Molecular Biology
Charles Henry	Chemistry
Matthew Hickey	Health & Exercise Sciences
Douglas Ishii	Biomedical Sciences and Biochemistry & Molecular Biology
Shane Kanatous	Biology
John Kisiday	Clinical Sciences
Susan Kraft	Environmental & Radiological Health Sciences
Nora Lapitan	Soil & Crop Sciences
Susan LaRue	Environmental & Radiological Health Sciences
Paul Laybourn	Biochemistry & Molecular Biology
Marie Legare	Environmental & Radiological Health Sciences
Howard Liber	Environmental & Radiological Health Sciences
Karolin Luger	Biochemistry & Molecular Biology
June Medford	Biology
Benjamin Miller	Health & Exercise Sciences
Paul Morley	Clinical Sciences
Donald Mykles	Biology
Jac Nickoloff	Environmental & Radiological Health Sciences
Jennifer Nyborg	Biochemistry & Molecular Biology
Rodney Page	Clinical Sciences
Michael Pagliosotti	Food Science & Human Nutrition
Christie Peebles	Chemical & Biological Engineering
Olve Peersen	Biochemistry & Molecular Biology
Marinus Pilon	Biology
Ashok Prasad	Chemical & Biological Engineering
Sandra Quackenbush	Microbiology, Immunology & Pathology
Rajinder Ranu	Bioagricultural Sciences & Pest Management
F. Andrew Ray	Environmental & Radiological Health Sciences
Kenneth Reardon	Chemical & Biological Engineering
Anireddy Reddy	Biology
Noreen Reist	Biomedical Sciences
Deborah Roess	Microbiology, Immunology & Pathology
Eric Ross	Biochemistry & Molecular Biology
Elizabeth Ryan	Clinical Sciences
Herbert Schweizer	Microbiology, Immunology & Pathology
George Seidel, Jr.	Biomedical Sciences
Richard Slayden	Microbiology, Immunology & Pathology
Stephen Stack	Biology
Laurie Stargell	Biochemistry & Molecular Biology

Erica Suchman	Microbiology, Immunology & Pathology
Name	Department
Michael Tamkun	Biomedical Sciences
Douglas Thamm	Clinical Sciences
Henry Thompson	Horticulture & Landscape Architecture
Ronald Tjalkens	Environmental & Radiological Health Sciences
Stuart Tobet	Biomedical Sciences
Susan Tsunoda	Biomedical Sciences
Jozsef Vigh	Biomedical Sciences
Jorge Vivanco	Horticulture & Landscape Architecture
John Volckens	Environmental & Radiological Health Sciences
Michael Weil	Environmental & Radiological Health Sciences
Carol Wilusz	Microbiology, Immunology & Pathology
Jeffrey Wilusz	Microbiology, Immunology & Pathology
Stephen Withrow	Clinical Sciences
Raymond Yang	Environmental & Radiological Health Sciences
Tingting Yao	Biochemistry & Molecular Biology
Mark Zabel	Microbiology, Immunology & Pathology



Affiliate Faculty: from outside CSU.

Name	Institution
Andrew Thornburn	University of Colorado, School of Medicine
Philip Tucker	University of Texas Austin

New Faculty: seven new faculty members have joined CMB during the past year.

Name	Department
Christopher Gentile	Food Science and Human Nutrition
Kim Hoke	Biology
Jan Leach	Bioagricultural Sciences and Pest Management
Graham Peers	Biology
Glenn Telling	Microbiology, Immunology & Pathology
Philip Westra	Bioagricultural Sciences and Pest Management
Tiffany Weir	Food Science and Human Nutrition

STUDENTS

The CMB Graduate Program currently oversees 63 graduate students (12 MS students and 51 PhD students) conducting research in labs distributed throughout the five colleges represented by our faculty members (see **table 1** for numerical data on the CMB graduate students as of fall 2011). In 2011-2012 academic year, the program awarded two M.S. degrees and six Ph.D. degrees in Cell and Molecular Biology.

Table 1. Numerical Data on CMB Graduate Students

Student Category	Number	Percent
Program		
MS	12	19
PhD	51	81
Total	63	100
Gender		
Male	27	43
Female	36	57
Ethnicity		
Asian American	2	3
African American	2	3
Native American	0	0
Hispanic	8	13
Caucasian	30	48
International	21	33
College of Advisor		
CVMBS	41	65
CNS	11	18
Engineering	1	2
Appl. Human Sciences	4	6
Ag Sciences	4	6
Undeclared (rotating)	2	3

In the fall 2011 semester, the program matriculated nine new Ph.D. students and two MS students. Of the nine PhD students, three DVM/Ph.D. students were admitted to the Cancer Biology program and three MAS IGERT Program students were admitted. In the spring 2012 semester the CMB program admitted three PhD students and two MS students. The CMB Graduate Program has been expanding each year for the last several years. Approximately 53 domestic and 42 international students applied to the CMB program for admittance fall 2012.

Year Enrolled	Fa2006	Fa2007	Fa2008	Fa2009	Fa2010	Fa2011	Ave
Ave Verb	516	484	444	537	562	548	515
Ave Quant	666	565	644	671	612	583	624
Ave Anal	630	670	4	4	4.5	3.70	650/4
Ave GPA	3.76	3.53	3.64	3.58	3.68	3.34	3.59

As an umbrella program for graduate student recruitment and training, the CMB Graduate Program attracts very strong students to conduct research in the laboratories of the CMB Faculty Members. Their GRE scores and undergraduate GPAs upon entrance to our program (see table above) indicate the quality of the students in our program.

Entering Year	Number Applied	Number Accepted	Number Enrolled	Still in Program	Earned PhD	Earned MS	Left No Degree	Reason Left
2005	51	18	12	1	5	5	1	grad schl not good fit
2006	31	17	9	6	0	2	1	grad schl not good fit
2007	110	16	10	6	0	1	1	grad schl not good fit
2008	109	13	9	7	0	0	2	1 moved for fiancé 1 acad dismissal
2009	92	12	9	7	0	0	2	grad schl not good fit family emergency
2010	71	22	17	16	0	0	1	to become a nun
2011	95	14	12	12	0	0	0	
Ave	80	16	11					

As shown by the data above, few students leave the CMB Program without earning a degree. Students that do leave generally do so for personal reasons or upon finding that biomedical research in graduate school is not for them. For the most part, this success should be attributed to the committed CMB Faculty advisors and the quality and commitment of our students to science. However, we feel it is also the result of strong support and advising of the students in our program throughout their tenure as a graduate student.

CMB Graduate Student Publications with CMB Faculty, by year enrolled											
Class year	00-01	01-02	02-03	03-04	04-05	05-06	06-07	07-08	08-09	09-10	10-11
Student in class	14	13	17	19	12	14	10	12	16	15	16
Pubs per class	26	28	31	47	15	27	20	13	7	2	0

Importantly, these students average 2-3 publications each from their research in the CMB Faculty Members laboratory at or soon after graduation (see table above). Finally, upon graduation the CMB students go on to successful careers in science. Of the 40 CMB Ph.D. Program graduates since 2006, four have a faculty position; 14 have research scientist or professional scientist (DVM, forensics, biotechnology) positions, one is in scientific equipment sales, and 18 are now postdoctoral fellows.

The major limitation to accepting students has been the lack of GTA funding for the first year. During this past year, the program continued to implement improved procedures to monitor student progress and to ensure timely completion of qualifying examinations. It also continued to expand program participation in the annual CMB/MCIN Graduate Student Poster Symposium. A major goal of the CMB program is to seek greater institutional and external support for training graduate students. We applied for PRSE status and training grants from NIH (T32 in Cancer Biology) and the DOE (GAANN). Finally, the CMB graduate program will continue to recruit outstanding students who will become valued participants and contributors to an interdisciplinary effort to promote research in Cell and Molecular Biology on campus.

Recruitment of URM applicants is key to increasing the proportion of URM students in our program. Direct, active recruitment of URM students is the most effective approach. The Director of the CMB Graduate Program, Dr. Paul Laybourn, is also Director of the NSF funded CSU Research Experience for Undergraduates (REU) Site in Molecular Biosciences. This 10-week summer program provides research experiences in the laboratories of CSU faculty, most all of whom are also CMB faculty members. Participants are recruited from colleges and universities with high proportions of URM students through materials mailed and emailed to their home institutions and at the SACNAS and ABRCMS national conferences held each fall. As Director of this REU Program for the past 12 years, Dr. Laybourn has established strong ties with directors of other REU programs at minority serving institutions. In addition, Dr. Laybourn has taken on a leadership role in SACNAS (2010 Leadership Institute participant, 2011 National Conference Planning Committee and Ambassador) and serves on the NIGMS MORE grant review committee (MPRC-A). Over the past three years the REU program has attracted an average of 252 applications per year for 10 positions, of which 51% have better than a 3.7/4.0 GPA, 13% are URM members, and 68% are women. The 31 participants in the past three summers had an average GPA of greater than 3.75/4.0, were 77% URM students and were 52% female. It should

be noted that applicants and participants have come from every U.S. state and Puerto Rico. Over the past twelve years 20 REU participants have applied to CSU graduate programs and eight have enrolled. CSU graduate programs must compete with UC Berkeley, Stanford University, Johns Hopkins, Harvard, etc. graduate programs for recruitment of the REU participants. The benefits of the REU program in strengthening our graduate student applicant pool extend beyond the actual REU participants to other students at their home institutions through communication of their positive experiences at CSU to their friends and advisors.

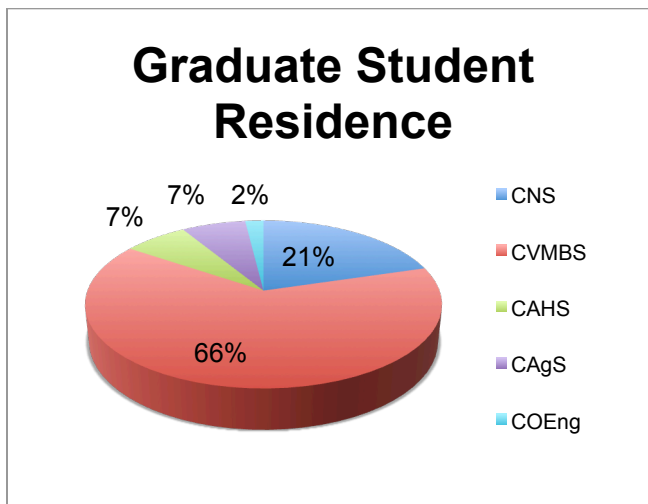
CSU has established an NSF-funded alliance (Colorado Alliance for Graduate Education and the Professoriate or AGEPE) with the University of Colorado, Boulder to recruit and support graduate students in the sciences with the goal of increasing the number of URM science faculty. The CMB Program is an AGEPE graduate program and the CMB Director is a member of the CSU Diversity Strategic Planning Committee.

From 1998 to 2008, the proportion of URM students in CSU science graduate programs has increased from 5% to 7%. In 2008 the CMB program had nearly 23% URM graduate students and an average of slightly greater than 15% over the past six years. While there has been an improvement in minority graduate student recruitment through the activities described above, a sustained effort and commitment over decades will be required to achieve parity with the proportion of URMs in the U.S. and Colorado population.

Current Students:

<u>Name</u>	<u>Degree</u>	<u>Advisor</u>	<u>Date Admitted</u>
Mario Aguiar	Ph.D.	Still rotating (MAS)	Fall 2011
Guadalupe Aguirre	Ph.D.	Still rotating (MAS)	Fall 2011
Elizabeth Akin	Ph.D.	Mike Tamkun	Fall 2010
Stevan Albers	Ph.D.	Stephen Chisholm	Fall 2010
Elwiah Alhashim	M.S.	Deborah Roess	Spring 2012
Fatima Alheiji	M.S.	Deborah Roess	Spring 2012
Hanan Ashanta	M.S.	Deborah Roess	Spring 2011
Jennifer Arab	M.S.	Ramesh Akkina	Fall 2009
Nadia Ashwish	Ph.D.	Deborah Roess	Spring 2009
Rebecca Barnard	Ph.D.	Dan Gustafson	Fall 2010
Michael Barnhart	M.S.	Jeff Wilusz	Fall 2011
Zobaida Ben Musa	Ph.D.	Eric Ross	Spring 2009
Srinivasa Boddeda	Ph.D.	Chaoping Chen	Spring 2011
Michael Caballero	Ph.D.	Graham Peers	Fall 2011
James Carsella	Ph.D.	Debbie Crans	Fall 2011
Kathy Cosenza	Ph.D.	Don Mykles	Fall 2008
Deanna Dailey	Ph.D.	Dawn Duval	Fall 2011
Melissa Edwards	Ph.D.	Mark Brown	Fall 2011
Ahmed Elbakush	Ph.D.	Deborah Roess	Fall 2010
Zeyad El Rafadi	M.S.	Howard Liber	Fall 2011
Mustafa Elrlmy	Ph.D.	Deborah Roess	Spring 2011
Vanessa Enriquez	Ph.D.	Gerritt Bouma	Fall 2008
Laura Epple	Ph.D.	Barbara Biller	Fall 2009
Kristen Farrell	Ph.D.	Santiago Di Pietro	Fall 2010
John Fitts	Ph.D.	Deborah Garrity	Fall 2009
Fabio Fontes	Ph.D.	Deborah Crans	Spring 2012
Jared Fowles	Ph.D.	Dan Gustafson	Fall 2007
Phillip Fox	Ph.D.	Mike Tamkun	Fall 2009
Krystle Frahm	Ph.D.	Stu Tobet	Fall 2009
Scott Fulbright	Ph.D.	Stephen Chisholm	Fall 2009
Lakshmi Gummadi	Ph.D.	Norman Curthoys	Fall 2006
Theo Gurol	Ph.D.	J. Lucas Argueso	Fall 2010
Guima Hadhoud	M.S.	Deborah Roess	Fall 2010
Chuck Halsey	Ph.D.	Dan Gustafson	Fall 2009
Victoria Harcy	Ph.D.	Adam Chicco	Fall 2010

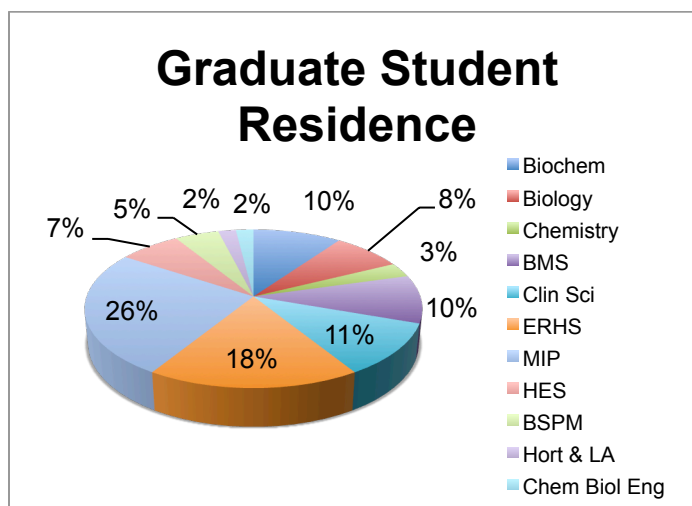
<u>Name</u>	<u>Degree</u>	<u>Advisor</u>	<u>Date Admitted</u>
Brie Hawley	Ph.D.	John Volckens	Fall 2010
Shuang Hu	Ph.D.	Ramesh Akkina	Spring 2012
Toru Ishii	Ph.D.	Scott Earley	Fall 2009
Nasir Jalal	Ph.D.	Howard Liber	Fall 2007
Aimee Jalkanen	Ph.D.	Carol Wilusz	Fall 2011
Tobi Krause	M.S.	Karin Hamilton	Fall 2007
Catherine Le	Ph.D.	Matt Hickey	Fall 2008
Junko Maeda	Ph.D.	Takamitsu Kato	Fall 2011
Shawna Matthews	Ph.D.	Henry Thompson	Fall 2009
Ashley Neff	Ph.D.	Carol Wilusz	Fall 2008
Christopher Nelson	Ph.D.	Susan Bailey	Fall 2011
Jingyi Nie	Ph.D.	Jac Nickoloff	Fall 2008
Donasian Ochola	Ph.D.	Mike Weil	Fall 2009
Natalie Pitts	Ph.D.	Don Mykles	Fall 2010
Mia Routh	M.S.	Adam Chicco	Fall 2010
Audrey Ruple	Ph.D.	Paul Morley	Spring 2010
Rema Saad	M.S.	Howard Liber	Spring 2011
Tara Schumacher	Ph.D.	Ken Reardon	Fall 2006
Hoda Shnaishah	M.S.	Deborah Roess	Spring 2009
Jordan Steel	Ph.D.	Brian Geiss	Fall 2009
Matt Stratton	Ph.D.	Stu Tobet	Summer 2008
Eric Tauchman	Ph.D.	Jennifer DeLuca	Fall 2009
Alejandro Trujillo	Ph.D.	Debbie Crans	Fall 2008
Christopher Van Horn	Ph.D.	Philip Westra	Fall 2011
Melina Veselinovik	Ph.D.	Ramesh Akkina	Spring 2012
Hiroto Yoshikawa	Ph.D.	Sue LaRue	Fall 2008
Molly Zeller	Ph.D.	Deborah Garrity	Fall 2011



Distribution of the CMB Graduate Student Laboratory Residence by College and Department

- 21% College of Natural Sciences (13 students)
 - 10% Biochemistry and Molecular Biology (6 students)
 - 8% Biology (5 students)
 - 3% Chemistry (2 students)
- 66% College of Veterinary Medicine and Biomedical Sciences (40 students)
 - 10% Biomedical Sciences (6 students)
 - 11% Clinical Sciences (7 students)
 - 18% Environmental and Radiological Health Sciences (11 students)
 - 26% Microbiology, Immunology and Pathology (16 students)
- 7% College of Applied Human Sciences (4 students)
 - 0% Food Science and Human Nutrition (0 students)
 - 7% Health and Exercise Science (4 students)

- 7% College of Agricultural Science (4 students)
- 5% Bioagricultural Science and Pest Management (3 students)
- 2% Horticulture and Landscape Architecture (1 student)
- 0% Soil and Crop Science (0 students)
- 2% College of Engineering (1 student)
- 2% Chemical and Biological Engineering (1 student)



Breakdown of Current Graduate Students by Ethnicity and Gender

Student Level & Ethnicity/Race/Gender	Fall 2004	Fall 2005	Fall 2006	Fall 2007	Fall 2008	Fall 2009	Fall 2010	Fall 2011
Native American Male	0	0	0	0	0	0	0	0
Native American Female	0	0	0	0	3	2	1	0
Black Male	0	0	0	0	0	1	1	1
Black Female	0	0	0	0	1	1	0	1
Asian American Male	2	2	3	3	3	2	0	0
Asian American Female	1	2	2	2	3	3	3	2
Hispanic Male	0	0	0	1	1	1	2	4
Hispanic Female	1	0	0	0	1	2	3	3
White Male	15	18	17	18	14	17	17	12
White Female	20	20	24	18	13	12	16	16
International Male	6	5	6	7	9	8	9	9
International Female	9	8	7	5	5	8	8	12
Other Male	0	0	0	0	0	0	0	0
Other Female	0	0	0	0	0	0	0	0

Funded research –estimate by # graduate students * estimated costs per graduate student (\$21,750 stipend, tuition, benefits + \$10,000 supplies, etc. = ~\$32,000. Note that means for tracking this more directly needs to be developed.

	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12
MS	10	10	14	11	5	7	8	9	12
	320,000	320,000	448,000	352,000	160,000	224,000	256,000	288,000	384,000
PhD	39	41	41	46	40	50	50	46	51
	1,248,000	1,312,000	1,312,000	1,472,000	1,280,000	1,600,000	1,600,000	1,472,000	1,632,000
total	49	51	55	55	45	57	58	55	63
	1,568,000	1,632,000	1,760,000	1,760,000	1,444,000	1,824,000	1,856,000	1,760,000	2,016,000

Graduated Students

Eight students received their degrees during the past year, three M.S. and five Ph.D. students. A complete list of students who have graduated from CMB is given below.

<u>Name</u>	<u>Degree</u>	<u>Advisor</u>	<u>Graduated</u>
Phuong Le	Ph.D.	Susan Bailey	Spring 2012
Abdunaser Eadaim	M.S.	Susan Bailey	Spring 2012
Mia (Melissa) Routh	M.S.	Adam Chicco	Spring 2012
Luke Kingry	Ph.D.	Richard Slayden	Fall 2011
Preston Neff	Ph.D.	Ramesh Akkina	Fall 2011
Samantha Roth	M.S.	Don Mykles	Fall 2011
Hoda Shnaishah	M.S.	Debra Roess	Fall 2011
Peter Winter	Ph.D.	George Barisas	Fall 2011
Scott Hafeman	Ph.D.	Steven Dow	Summer 2011
Jerome Lee	Ph.D.	Carol Wilusz	Summer 2011
Chelsea Roan	M.S.	Deborah Roess	Summer 2011
Dezaray Varland	M.S.	Jozsef Vigh	Summer 2011
Shawna Campbell	M.S.	June Medford	Spring 2011
Ryan Dregalla	Ph.D.	Susan Bailey	Spring 2011
Fumi Sagawa	M.S.	Jeff Wilusz	Spring 2011
Scott Walmsley	Ph.D.	Norm Curthoys	Spring 2011
Aida Ulloa	Ph.D.	Barbara Sandborn	Fall 2010
Luke Wittenburg	Ph.D.	Doug Thamm	Summer 2010
Lisa Kellihan	M.S.	Steven Dow	Spring 2010
Xiangfei Liu	Ph.D.	Robert Ullrich	Spring 2010
Joseph Sottnik	Ph.D.	Steve Dow	Spring 2010
Erica Chao	M.S.	June Medford	Fall 2009
Jes Kuruvilla	Ph.D.	Ramesh Akkina	Fall 2009
Pak, Chi	Ph.D.	Jim Bamburg	Fall 2009
Paul Kim	Ph.D.	Ken Allen	Fall 2009
Stephen Keysar	Ph.D.	Michael Fox	Summer 2009
Rebekah Klingler	Ph.D.	F. Andrew Ray	Summer 2009
Casey Boczon	M.S.	Paul Kugrens	Spring 2009
Lisa Chamberlain	Ph.D.	David Grainger	Spring 2009
Eric Lee	M.S.	Mercedes Gonzalez-Juarrero	Spring 2009
Julie Moreno	Ph.D.	Ron Tjalkens	Spring 2009
Jun Zhou	M.S.	Deborah Roess	Spring 2009
Kristin Askin	Ph.D.	Robert Ullrich	Fall 2008
Amy Boczon	M.S.	Rajinder Ranu	Fall 2008
Corey Broeckling	Ph.D.	Jorge Vivanco	Fall 2008
Ron Carsten	Ph.D.	Robert Ullrich	Fall 2008
Jennifer Chiniquy	M.S.	Jon Carlson	Fall 2008
Tracy Nichols	Ph.D.	Mark Zabel	Fall 2008
Sung-Bong Shin	Ph.D.	Anireddy Reddy	Fall 2008
Abby Williams	Ph.D.	Robert Ullrich	Fall 2008
Kevin Flynn	Ph.D.	James Bamburg	Summer 2008
Kristy McClellan	Ph.D.	Stuart Tobet	Summer 2008
Camilla Kristensen	M.S.	Mike Tamkun	Summer 2008
Amanda Ashley	Ph.D.	William Hanneman	Spring 2008
James Bogenberger	Ph.D.	Paul Laybourn	Spring 2008
Kitty Brown	M.S.	Karolin Luger	Spring 2008
Jennifer Devitt	Ph.D.	Sue LaRue	Spring 2008
R. Tanner Hagelstrom	Ph.D.	Robert Ullrich	Spring 2008
Susan Hudachek	Ph.D.	William Dernel	Spring 2008
Scott McCorvey	M.S.	Steven Dow	Spring 2008
Tiffany Weir	Ph.D.	Jorge Vivanco	Spring 2008
Guanxiong Xiao	Ph.D.	Michael Weil	Spring 2008
Angela Morrison	M.S.	Jeff Wilusz	Fall 2007
Alison White	M.S.	Karolin Luger	Fall 2007
Eli Williams	Ph.D.	Robert Ullrich	Fall 2007

<u>Name</u>	<u>Degree</u>	<u>Advisor</u>	<u>Graduated</u>
Debra Davison	M.S.	Marie Legare	Summer 2007
Alfred Flint	Ph.D.	William Hanneman	Summer 2007
Jingjing Liu	Ph.D.	Deborah Roess	Summer 2007
Susan McGrath	M.S.	Herbert Schweizer	Summer 2007
Junqing Zhou	Ph.D.	Howard Liber	Summer 2007
Mike Abernathy	M.S.	Michael Fox	Spring 2007
Daniel Konet	Ph.D.	Jonathan Carlson	Spring 2007
Kyoung Hee Choi	Ph.D.	Herbert Schweizer	Fall 2006
Mark Clark	M.S.	Pat Bedinger	Summer 2006
Marisha Godek	Ph.D.	David Grainger	Summer 2006
Sung-Gu Lee	Ph.D.	Don Mykles	Summer 2006
Colleen McWilliams	M.S.	David Grainger	Summer 2006
Carley Ross	Ph.D.	Michael Fox	Summer 2006
Ginny Schmit	M.S.	Jennifer Nyborg	Summer 2006
Traci Nichols	M.S.	William Hanneman	Spring 2006
Aaron Thompson	Ph.D.	Olve Peersen	Spring 2006
Christine Lee	M.S.	Ramesh Akkina	Spring 2006
Brian Barth	M.S.	Michael Fox	Fall 2005
Adam Holmes	M.S.	Charles Waldren	Fall 2005
Ying Lei	Ph.D.	Deborah Roess	Fall 2005
Junqing Zhou	M.S.	Howard Liber	Fall 2005
James Bogenberger	M.S.	Paul Laybourn	Summer 2005
Jingjing Liu	Ph.D.	Deb Roess	Summer 2005
Sung-Bong Shin	M.S.	Anireddy Reddy	Spring 2005
Kristin Askin	M.S.	Robert Ullrich	Fall 2004
Purabi Dhakras	M.S.	Norm Curthoys	Fall 2004
Jennifer Malone	Ph.D.	Robert Ullrich	Fall 2004
Dhanashree Joshi	M.S.	Michael Fox	Summer 2004
Chang-Uk Lim	Ph.D.	Michael Fox	Spring 2004
Jill Livengood	Ph.D.	Jennifer Nyborg	Spring 2004
Hyun-Woo Kim	Ph.D.	Don Mykles	Spring 2004
Joseph Gogain	Ph.D.	Marv Paule	Fall 2003
Susan Hudachek	M.S.	Greg Florant	Fall 2003
Sean Lupien	Ph.D.	Douglas Ishii	Fall 2003
Venu Muni	M.S.	Steve Stack	Fall 2003
Qing Zhao	M.S.	Douglas Ishii	Summer 2003
Carrie Tyszko	M.S.	Russell Anthony	Spring 2003
Buffy Ellsworth	Ph.D.	Colin Clay	Fall 2002
Richard Griffith	M.S.	Gordon Niswender	Fall 2002
Rachelle Lynn	M.S.	William Hanneman	Fall 2002
Bridget Robinson	M.S.	Joseph Smith	Spring 2002
Xiaoli Yu	Ph.D.	Don Mykles	Spring 2002
Sandra Gunselman	Ph.D.	Charles Waldren	Fall 2001
Amy Farris	M.S.	Colin Clay	Summer 2001
Anna Maria Al-Khoury	Ph.D.	Marv Paule	Spring 2001
Diane Hohorst	M.S.	Pat Bedinger	Summer 2000
Regina Horvat	Ph.D.	Deborah Roess	Spring 2000
Ryan Orbus	M.S.	Russell Anthony	Summer 1999
Meredith Holtzen	M.S.	Debbie Crans	Spring 1999
Fei Pan	M.S.	Herbert Schweizer	Spring 1999
Jonathan Bowser	M.S.	Anireddy S.N. Reddy	Spring 1998
Qing Li	M.S.	Kathy Partin	Spring 1998
Tara Nolan	M.S.	Colin Clay	Spring 1998
Suzanne Stratford	M.S.	Patricia Bedinger	Spring 1998

Department Total of Masters and Doctoral Degrees Conferred by Gender and Academic Year									
	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12
MS Total Male	0	1	3	1	1	3	0	1	0
MS Total Female	3	1	3	2	4	2	2	1	3
MS Total % Minority	0	0	17%	0	0	20%	0	50%	33%
PhD Total Male	4	1	3	2	5	4	5	4	4
PhD Total Female	2	2	4	4	5	6	0	1	1
PhD Total %Minority	0	33%	0	17%	0	0	0	20%	0%

Department Total of Masters and Doctoral Degrees Conferred by Gender, Race/Ethnicity and Academic Year

Unit Level & Gender	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11
Master's Level										
Native American Male	0	0	0	0	0	0	0	0	0	0
Native American Female	0	0	0	0	0	0	0	0	0	1
Black Male	0	0	0	0	0	0	0	0	0	0
Black Female	0	0	0	0	0	0	0	0	0	0
Asian American Male	0	0	0	0	0	0	0	2	0	0
Asian American Female	0	0	0	0	0	0	0	0	0	0
Hispanic Male	0	0	0	0	1	0	0	0	0	0
Hispanic Female	0	0	0	0	0	0	0	0	0	0
Non-Minority Male	0	2	0	1	2	1	0	1	0	0
Non-Minority Female	0	2	3	1	3	2	0	2	2	2
Doctoral Level										
Native American Male	0	0	0	0	0	0	0	0	0	0
Native American Female	0	0	0	0	0	0	0	0	0	0
Black Male	0	0	0	0	0	0	0	0	0	0
Black Female	0	0	0	0	0	0	0	0	0	0
Asian American Male	0	0	0	0	0	0	0	1	1	0
Asian American Female	0	0	0	0	0	1	0	0	0	1
Hispanic Male	0	0	0	0	0	0	0	0	0	0
Hispanic Female	0	0	0	1	0	0	0	0	0	0
Non-Minority Male	0	0	4	1	3	2	0	3	4	4
Non-Minority Female	3	0	2	1	4	3	0	6	0	0

ADMINISTRATION & COMMITTEE MEMBERS

The CMB program is jointly administered by the Dean of the Graduate School and the Deans of the College of Veterinary Medicine and Biomedical Sciences and the College of Natural Sciences. The Director is Dr. Paul Laybourn. There are four standing committees with responsibilities for different areas of the program. Terms for the Academic Committee and Research Committee are for two years, with two members being elected each spring. The members of the standing committees are listed below. The Steering Committee is the major policy-making committee and consists of the chairs of each of the four standing committees.

Academic Committee

Chairman: *Dr. Matt Hickey*, Department of Health & Exercise Sciences
Dr. Susan Bailey, Department of Environmental & Radiological Health Sciences
Dr. Sandra Quackenbush, Department of Microbiology, Immunology & Pathology
Dr. Deborah Garrity, Department of Biology

Research Committee

Chairman: *Dr. Adam Chicco*, Department of Health & Exercise Sciences
Dr. Eric Ross, Department of Biochemistry & Molecular Biology
Dr. Scott Earley, Department of Biomedical Sciences
Dr. Shane Kanatous, Department of Biology

Admissions Committee

Chairman: *Dr. Paul Laybourn*, Department of Biochemistry and Molecular Biology
Dr. Ron Tjalkens, Department of Environmental and Radiological Health Sciences
Dr. Scott Early, Department of Biomedical Sciences
Dr. Santiago Di Pietro, Department of Biochemistry and Molecular Biology
Dr. Shane Kanatous, Department of Biology

Seminar Committee

Chairman: *Dr. Howard Liber*, Department of Environmental & Radiological Health Sciences
Dr. Chaoping Chen, Department of Biochemistry & Molecular Biology
Dr. Lorrie Anderson, Department of Biology
Dr. Debbie Crans, Department of Chemistry

Steering Committee

Chairman: *Dr. Paul Laybourn*, Department of Biochemistry & Molecular Biology
Dr. Howard Liber, Department of Environmental & Radiological Health Sciences
Dr. Matt Hickey, Department of Health & Exercise Sciences
Dr. Adam Chicco, Department of Health & Exercise Sciences
Dr. Shane Kanatous, Department of Biology

Research Committee Activities

The research committee planned several activities designed to bring together the faculty and students to interact and learn about each other's research interests and expertise. The events included the annual CMB Research Symposium and co-sponsorship of the Frontiers of Science Seminar Series. Prospective new students were invited to visit campus at the same time as the symposium so they could meet many of the faculty members and students and constituted a key component of our recruitment activities.

Poster Competition

The Annual Cell and Molecular Biology Symposium was held on Friday, February 24, 2012 from 2:00 - 5:00 p.m. in the North Ballroom at the Lory Student Center. The event was co-sponsored by the Molecular, Cellular and Integrated Neuroscience Program, the Department of Biochemistry & Molecular Biology and the Department of Microbiology, Immunology & Pathology. Approximately 40 applicants to the CMB, MCIN, Biochemistry and Microbiology graduate programs attended the symposium. Sixty-seven posters were presented. Of those posters, 67 were judged. Two judges reviewed each poster. One Highest Honors award, two High Honors awards, seven Honors awards and four Honorable Mention awards were given to graduate student poster presenters. In addition, one postdoc award was given out. The judges were Drs. Greg Amberg, Rachel Angers, J. Lucas Argueso, Susan Bailey, Corey Broeckling, Chaoping Chen, Adam Chicco, Yun-Seok Choi, Robert Cohen, Norm Curthoys, Greg Florant, Alexander Franz, Melonnie Furgson, Deborah Garrity, Brian Geiss, Alan Godwin, Mercedes Gonzalez Juarrero, Ryan Hansen, Shing Ho, Shane Kanatous, Paul Laybourn, McKonnen Lemma Dechass, Candace Mathiason, Leah Mitchell, Rod Page, Saiprasad Palusa, Christie Peebles, Olve Peersen, Jessica Prenni, Andy Ray, Eric Ross, Alan Schenkel, Erica Suchman, Ron Tjalkens, Stu Tobet, Mark van der Woerd, Jozsef Vigh, Tiffany Wier, O'Neil Wiggan, Carol Wilusz, Jeff Wilusz, Luke Wittenburg, Tingting Yao and Mark Zabel.

The Post-doctoral Awards were:

Anna Kalashnikova Biochemistry & Molecular Biology

The Graduate Student Awards were:

Highest Honors

Gina Caldas Biochemistry & Molecular Biology

High Honors

Stephanie Moon Microbiology, Immunology and Pathology

Krystle Frahm MCIN/Cell & Molecular Biology

Honors

Jennette Shoeneman Cell & Molecular Biology

Lyndsie Sundin Biochemistry & Molecular Biology

Jarred Bultema Biochemistry and Molecular Biology

Kara Mosovsky Microbiology, Immunology & Pathology

Lakshmi Gummadi Cell & Molecular Biology

Scott Fulbright MAS/Cell & Molecular Biology

Kristen Farrell Cell and Molecular Biology

Honorable Mention

Ashley Neff Cell and Molecular Biology

Stevan Albers MAS/Cell & Molecular Biology

Daniel Krzizike Biochemistry & Molecular Biology

Jared Fowels Cell & Molecular Biology

The Research Committee members, Drs. Chicco, Ross, Earley and Kanatous wish to thank all of the contributors, the judges, and those who visited the CMB Student Poster Competition for contributing to its success.

Academic Committee Activities

The Academic Committee advised new students on lab rotations and class registration issues.

CMB Courses Taught

FALL 2011:

CM 502	Techniques in Molecular & Cellular Biology	Carol Wilusz (coordinator)
CM 510	Introduction to Cell & Molecular Biology	Paul Laybourn (coordinator)
CM 792	Cell & Molecular Biology Seminar	Howard Liber (coordinator)
CM 793	Seminar	Paul Laybourn (coordinator)

SPRING 2012:

CM 601	Responsible Conduct in Cell and Molecular Biology	Paul Laybourn
CM 792	Cell & Molecular Biology Seminar	Howard Liber (coordinator)
CM 793	Seminar	Paul Laybourn (coordinator)

The curriculum has undergone revision (see tables below for the current curriculum). CM 502 - Techniques in Cell Biology is now required for all students in the CMB Program. In addition, the Graduate Seminar course (CM 793) has been modified to create a venue for the review of each student's progress on his or her dissertation research each year through completion of the program. Briefly, the seminar presentation is coupled with a written progress report and a meeting with their advisory committee. At this same meeting the major advisor, in consultation with the advisory committee completes a progress evaluation form and submits it to the program Director. Finally, the program has instituted a requirement for PhD students to complete their preliminary (advance to candidacy) exam prior to the beginning of their third year in the program.

Requirements for PhD Degree

Course	Title	Credits
CM 501/BC 565	Advanced Cell Biology	4
CM 502	Techniques in Cell Biology	2
CM 510	Introduction/Orientation to the CMB Program (required for all rotating 1 st year students)	2
BC 563	Molecular Genetics	4
CM 792	Cell and Molecular Biology Seminar	1 (4 required)
CM 666, CM 601, BC 601 or MIP 654	Ethical Conduct of Science/Research	1-3
CM 793	Graduate Seminar (fall or spring of 2 nd , 3 rd & 4 th year)	1 (3 required)
CM 799	Dissertation	Variable
Electives (see list below)	At least 6 credits in regular graduate level courses	Variable
	Total credits required	72

Additional requirements for Cancer Biology (minimum 5 credits from this list)

Course	Title	Credits
ERHS 510	Cancer Biology	3
ERHS 611	Cancer Genetics	2
VS 780	Cancer Biology Clinical Practicum	2
ERHS 733	Environmental Carcinogenesis	3

Additional CMB Program Courses Offered

Course	Title	Credits
CM 520	Intracellular Proteolysis	3
CM 595	Independent Study	Variable

CM 699	Thesis	Variable
CM 640	Creative Science Writing	3
CM 701D	Radiation Cytogenetics	1
CM 701I	Planning Research Grant Proposals	2
CM 702B	Mammalian Cell Culture Techniques	1
CM 702C	Immunochemical Techniques	1
CM 702D	Radiation Cytogenetics	1
CM 702E	Flow Cytometry and Cell Sorting	2
CM 710	Techniques in Molecular Biology and Genetics	3
CM 784	Supervised College Teaching	Variable
CM 795	Independent Study (rotations)	Variable

Elective Courses Available

Course	Title	Credits
AGRI 545 02(2-0-0)	Plant Tissue Culture	2
AGRI 546 01(0-2-0)	Plant Tissue Culture Laboratory	1
BC 511 03(3-0-0)	Structural Biology I	3
BC 512 01(1-0-0)	Principles of Macromolecular Structure	1
BC 513 01(1-0-0)	Enzymology	1
BC 611 02(2-0-0)	Structural Biology II	2
BC 663 02(2-0-0)	Gene Expression	2
BC 665A 02(2-0-0)	Adv Topics in Cell Reg: Microscopic Methods	2
BC 665B 02(2-0-0)	Adv Topics in Cll Reg: Modern Methods	2
BSPM 740 03(3-0-0)	Plant Molecular Genetics	3
BMS 640 05(5-0-0)	Reproductive Phys & Endocrinology	5
BZ 402 04(3-3-0)	Chromosomes of Eukaryotes	4
BZ 570 03(3-0-0)	Molecular Aspects of Plant Development	3
BZ 642 03(3-0-0)	Plant Metabolism	3
CHEM 471 04(4-0-0)	Fundamentals of Physical Chemistry	4
CHEM 474 03(3-0-0)	Physical Chemistry I	3
CHEM 478 02(0-6-0)	Physical Chemistry Laboratory	2
CHEM 651AV-DV (Var)	Special Topics (inorganic and organic chem)	Variable
STAT 511 04(3-1-0)	Design and Data Analysis for Researchers I	4
STAT 512 04(3-1-0)	Design and Data Analysis for Researchers II	4
STAT 544 03(3-0-0)	Biostatistical Methods for Quantitative Data	3
MIP 530 03(3-0-0)	Advanced Molecular Virology	3
MIP 550 03(1-6-0)	Microbial and Molecular Genetics Laboratory	3
MIP 630 03(3-0-0)	Advances in Microbial Physiology	3
MIP 636 04(3-0-1)	Mechanisms of Viral Infection and Disease	4
MIP 651 03(3-0-0)	Immunobiology	3
MIP 740 03(2-0-1)	Microbial and Molecular Genetics	3
MIP 670 03(3-0-0)	Molecular Immunology and Immunogenetics	3
ERHS 550 05(5-0-0)	Principles of Radiation Biology	5
ERHS 751 03(3-0-0)	Advanced Radiation Biology I	3
ERHS 753 03(3-0-0)	Advanced Radiation Biology II ST	3

The PhD degree program in Cell in Molecular Biology incorporates additional mechanisms for advising, guidance and tracking of progress. Initially, the program Director acts as the advisor for first year students before they identify a research advisor. The Director and the CMB Coordinator help the new students with their move to Fort Collins and navigating the university bureaucracy. CM 510, Introduction/Orientation to the Cell and Molecular Biology Graduate Program, is designed to provide much of their remaining orientation. In the week prior to the start of classes first year students attend a one hour group orientation to remind them of the program requirements and apprise them of key issues like health insurance, applying for Colorado

residency, etc. This is followed by individual advising sessions for discussing class registration, individual issues, and their first laboratory rotation assignment. In the week before classes begin and the first two weeks of the semester there are five two hour sessions consisting of presentations by leading faculty in each of the eight research focus areas (cancer biology, infectious disease, neuroscience, reproductive biology, gene expression, structural biology, plant biology, and metabolism). In these sessions the students participate in discussions about potential research directions and projects, long-term career prospects and which laboratories have openings for a new student. In the final class period, the first year PhD program students describe their career path and goals. They also turn in a short paper on what they gained from the orientation course and where they are in formulating their long-term career goals. The program Director provides students feedback on both their talk and paper. A key purpose of the orientation course is to help the students identify the three laboratories for their rotations (approximately 10 week research projects; CM 795). The purpose of these rotations is to gain research experience and also for students to “try on” a lab and an advisor for good fit. They often function as a probationary period for the potential PhD advisor to evaluate the student’s skills, maturity and work ethic. By mid May of their first year, most first year students identify a PhD advisor and begin working full time in their laboratory. Those few that have not yet found a permanent advisor can do a fourth rotation over the summer.

Before or early in the first semester of the second year the PhD program students are required to form a Graduate Advisory Committee (GAC) chaired by their research advisor and consisting of CMB faculty chosen for expertise useful for successful completion of their dissertation research. It is this committee that recommends what elective courses the student will be required to take. Most students take a grant proposal-writing course like CM 640, CM 7011 or BC 701. Most of the regular course work including electives suggested by their GAC as important background for their PhD project is completed in the second year. Before beginning their third year, PhD program students must pass their advance to candidacy exam in which they orally defend a written proposal for their research project and demonstrate sufficient background knowledge in their chosen field.

In the remaining two to three years the students in the PhD program conduct their dissertation research, submit manuscripts to peer-review journals based on that research, and complete the program with the writing and defense of their dissertation. PhD candidate progress is tracked through participation in the CM 793 course. Students in the CMB PhD program must take this course at least once per year. In this course the students orally present their research progress. Other students and the program Director provide feedback on the quality of their presentation. Students are also required to notify their PhD advisor and Graduate Advisory Committee members of the date and time of their presentation, to submit a written progress report to their GAC members a week prior to their presentation, and to meet with their GAC within two weeks of their CM 793 presentation date. In this meeting the mentor, in consultation with the GAC members, completes a form evaluating the student’s oral and written progress report and research progress. This form is submitted to the program Director and kept in the student’s file. The student’s progress is officially recorded through their grade in CM 793 and CM 799. Through this process students receive input on their research and feedback on their oral and written communication skills at least once per year. The goal is to avoid students getting “stuck behind a brick wall” in their research project and unexpectedly learning that their PhD advisor and GAC do not agree that they are ready to defend their dissertation. This process also provides a “paper trail” of the student’s progress in the unfortunate event that a student is unable to successfully complete the PhD program.

Finally, the CMB program has established a Cell and Molecular Biology Student Association (CMBSA) that has been fully recognized by the CSU Student Association for several years. The CMBSA has been fortunate to have of a series of very active sets of officers. The CMBSA

sponsors student organized career seminars and social activities throughout the year. The CMBSA is also an integral participant in our efforts to recruit new students to the CMB Graduate Program.

In 2005, the CMB Program developed a new specialization in Cancer Biology. This program has attracted foundation and university AEP funding that supports fellowships for recruiting additional PhD and DVM/PhD students. Students in the Cancer Biology concentration complete additional courses (see Additional Requirements for Cancer Biology in Appendix 2).

Each year several of the PhD students in the CMB Program are in the process of earning their DVM (essentially a DVM/PhD program) or already have their DVM. Most of these students are in the Cancer Biology Program, but a couple of these students are pathology residents. These students are clearly highly qualified and motivated. They also address a significant need for biomedical researchers using animal models to address human health issues, while at the same time addressing animal health issues.

Admissions Committee Activities

The Admissions Committee reviews applications received by the CMB program and recommends whether to invite them to visit for an interview and whether to offer them admission into the program.

In the fall 2011 semester, the program matriculated nine new Ph.D. students and two MS students. Of the nine PhD students, three DVM/Ph.D. students were admitted to the Cancer Biology program and three MAS IGERT Program students were admitted. In the spring 2012 semester the CMB program admitted three PhD students and two MS students. The CMB Graduate Program has been expanding each year for the last several years. Approximately 53 domestic and 42 international students applied to the CMB program for admittance fall 2012.

Year Enrolled	Fa2006	Fa2007	Fa2008	Fa2009	Fa2010	Fa2011	Ave
Ave Verb	516	484	444	537	562	548	515
Ave Quant	666	565	644	671	612	583	624
Ave Anal	630	670	4	4	4.5	3.70	650/4
Ave GPA	3.76	3.53	3.64	3.58	3.68	3.34	3.59

As an umbrella program for graduate student recruitment and training, the CMB Graduate Program attracts very strong students to conduct research in the laboratories of the CMB Faculty Members. Their GRE scores and undergraduate GPAs upon entrance to our program (see table above) indicate the quality of the students in our program.

History of Average Verbal, Quantitative, and Analytical GRE Scores for Entering Graduate Students

Test Area and Unit Level	Fall 2002	Fall 2003	Fall 2004	Fall 2005	Fall 2006	Fall 2007	Fall 2008	Fall 2009	Fall 2010	Fall2011
Average Verbal Scores	509	493	509	529	516	484	444	537	562	429
Aver. Quantitative Scores	666	639	669	682	666	565	644	671	612	612
Aver. Analytical Scores	710	609	637	707	630	670	4	4	4.5	4.2
Aver. GPA	3.37	3.42	3.40	3.42	3.76	3.53	3.64	3.58	3.68	3.41

In the 2012 applicant pool there were 53 domestic applicants (6 MS, 47 PhD) and 43 international applicants. Within the domestic applicant pool the average GPA was 3.332, and the average combined GRE score was 312/1138/4. Of this pool, 19 students were invited to attend our recruiting weekend and to participate in the fourth annual combined CMB/MCIN Graduate Student Poster Symposium on February 24, 2012. Fourteen of these applicants accepted the invitation (average GPA 3.39). For comparison with previous years see the table above.

	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11
Applications	103	87	81	58	50	31	110	72	92	88
Admits	31	27	17	25	26	17	16	13	12	13
Enrolled	10	12	16	10	12	9	10	9	9	10
% Admits Enrolled	32	44	94	40	46	53	63	69	75	77

The table above summarizes the number of applications received, accepted, denied, and enrolled over the past ten years for comparison.

Seminar Committee Activities:

The seminar committee solicits national and international speakers to present their latest research to the CMB students and faculty. In addition, each semester two to three faculty members, particularly new faculty, present their research to keep the students and other faculty members apprised of their latest research interests and results. Students who register for the seminar class also get experience writing reports that are graded by members of the seminar committee or their mentors. Thus, it serves a dual purpose of informing the students about different areas of research and practicing their writing skills. The seminars given during the past year are listed below.

FALL 2010 SEMINAR SPEAKERS

DATE	SPEAKER AND HOST	SPEAKER AFFILIATION	SEMINAR TITLE
Thurs Aug 26	Dr. Noreen Reist	Colorado State University	Synaptic Transmission: How does the Ca ²⁺ sensor work?
Mon Aug 30	Lars Nordenskiöld Host: Karoin Luger	School fo Biological Sciences Nanyang Technolglcal University - Singapore	Electrostatic and Molecular Mechanisms in Chomatin Compaction
Thurs Sep 2	Dr. Xiaolei Xu Host: Debbie Garrity	Mayo Clinic	Functional Analysis of Tcap in Muscular Dystrophy and Cardiomyopathy Using Zebrafish Genetics
Mon Sep 13	Dr. David Clark Host: Jeff Hansen	NIH Program in Genomics of Differentiation	Nucleosomes, chromatin remodeling and histone gene regulation in budding yeast
Thurs Sept 16	Dr. Cathy Drennan Host: Dr. Debbie Crans	Massechusetts Institute of Technology	Shake, Rattle and Roll: Crystallographic Snapshots of Metalloproteins in Action
Fri Sept 17	Dr. Kevin Flynn Host: Dr. James Bamberg	Max Planck Institute of Neurobiology Martinsried Germany	ADF/Cofilin-mediated Actin Turnover Directs Neurite Formation in the Developing Brain
Wed Sep 22	Dr. Mario Capecchi Frontiers in Biomedical Sciences	University of Utah	Gene Targeting into the 21st Century: Mouse Models of Human Disease from Cancer to Neuropsychiatric Disorders
Thur Oct 7	Dr. Charles Scoggins Host: Karolin Luger	N30 Pharmaceuticals	Discovery of S-Nitrosoglutathione Reductase (GSNOR) Inhibitors as a New Class of Anti-Inflammatories
Mon Oct 11	Steve Foster, Dir. & Rodman Tomkins, Assoc. Dir.,	Business Development, CSURF Technology Transfer Office	Intellectual Property, Technology Transfer and You: Making the Most of Your Research
Thurs Oct 21	Dr. William K. Kaufmann Host: Jac Nickoloff	University of North Carolina Lineberger Comprehensive Cancer Center	Mechanisms of Chromosomal Instability in Environmental Melanoma
Mon Oct 25	Dr. Christopher Hill Host: Bob Cohen	University of Utah	Proteasome Activation: Opening the Gate to Nature's Molecule of Mass Destruction
Thur Nov 4	Dr. Shane Kanatous	Colorado State University	Exercising While Holding Their Breath: The Physiology of Diving Mammals
Mon Nov 8	Dr. P. John Hart Host: Jeff Hansen	University of Texas Health Sciences Center - San Antonio	Misfolded Copper-Zinc Superoxide Dismutase and Motor Neuron Disease
Mon Dec 6	Dr. Joan Conway Host: Tingting Yao	Stowers Institute for Medical Research	A Role of Mediator of RNA Polymerase II Transcription in Elongation Control

SPRING 2011 SEMINAR SPEAKERS

DATE	SPEAKER AND HOST	SPEAKER AFFILIATION	SEMINAR TITLE
Mon Jan 24	Dr. Terace Fletcher Host: Jeff Hansen	University of Miami School of Medicine	Chromatin Higher-Order Structure and Genome Maintenance
Thurs Feb 3	NO SEMINAR		
Wed Feb 09	Dr. Ron Weiss Host: June Medford	Massechusetts Institute of Technology School of Engineering	Synthetic Biology: From Modules to Systems
Fri Feb 18	Dr. Frederic Meunier Host: Noreen Reist	University of Queensland Neuronal Trafficking Laboratory	Munc18-1 Controls Syntaxin 1a Trafficking to the Plasma Membrane: Molecular Basis of Early Infantile Epileptic Encephalopathy
Mon Feb 21	Dr. Martin Margittai Host: Eric Ross	University of Denver Dept. of Chemistry & Biochemistry	Seed, Propagate, and Break: Prion-like Properties of Tau Fibrils
Thurs Mar 3	Dr. Michael Graner Host: Laura Epple	University of Colorado Denver Department of Neurosurgery	Spewing fat balls while under siege: the unfolded protein response and exosomes in the biology of brain tumors
Mon	Dr. J. Lucas Arguerso Host:	Colorado State University ERHS	Structural genomic variation in yeast: Lessons from

Mar 07	Laurie Stargell		basic and applied research
Mon Mar 28	Dr. Maithreyen Srinivasan Host: Norm Curthoys	Agilent Technologies Santa Clara, CA	Massively Parallel Human Exome Analysis using 2 nd Generation DNA sequencing
Thurs Mar 31	Dr. Robert Sclafani Host: Dr. Jac Nickoloff	University of Colorado School of Mines	Checkpoint Protein Kinases Regulate DNA Replication and Cancer Chemoprevention
Thurs Apr 7	Dr. Bin Tian Host: Carol Wilusz	UMDNJ New Jersey Medical School	The Long and Short of Alternative Polyadenylation
Thurs April 21	Dr. David Markovitz Host: Ramesh Akkina	University of Michigan Ann Arbor	The Exciting Life of a Human Endogenous Retrovirus
Thurs May 5	Dr. Robin Dowell Host: J. Lucas Argueso	CU Boulder	Yeast as a Model for Personalized Genomics

Summary:

The excellence of the scholarly activities of the CMB faculty has been acknowledged through many prestigious honors and awards (CSU, national and international), appointments, and speaking invitations. The faculty members in the CMB Graduate Program have garnered a wide array of prestigious CSU, national and international awards and honors through the careers as faculty and scientists. Examples particularly worth noting are several College of Natural Sciences Professor Laureates, Monfort Professors, Pew Scholars, an HHMI Investigator, CSU Pennock Service Awardees, and Cermack Advising Awardees. The CMB faculty members are invited to speak at other institutions in the US and abroad, as well as at national and international scientific conferences. Most CMB faculty members serve as manuscript and grant application reviewers, many as editors and committee chairs. A large proportion of the CMB faculty members have leadership roles in scientific societies and as organizers of national and international scientific symposia. On average, CMB faculty members have published 17 journal articles and have been cited 232 times (9.4 times per article) since 2006. Finally, many members have patents. The CMB faculty members are well funded with an average of \$1,677,042 in funding per faculty member from 2006 to 2011, or \$335,409 per faculty per year. Finally, a large number of CMB faculty members collaborate with researchers from across the US and the world. Similarly, they are able to attract postdoctoral fellows nationally and internationally.

Very recently, through the efforts of Provost Rick Miranda, a task force and a couple of Faculty Council standing committees the administrative reporting line and budget oversight has been restored to the Graduate School (Dean of the Graduate School) in conjunction with the Deans of the College of Natural Sciences and the College of Veterinary Medicine and Biomedical Sciences.

Recruitment of URM applicants is key to increasing the proportion of URM students in our program. Direct, active recruitment of URM students is the most effective approach. A key component of our recruitment activities include inviting prospective new students (applicants strong enough to be interviewed) to visit campus the same weekend as the Annual Cell and Molecular Biology Poster Symposium so they can interact with the CMB faculty and students. This Symposium is held on the last Friday in February. The event is co-sponsored by the Molecular, Cellular and Integrated Neuroscience Program, the Department of Biochemistry & Molecular Biology and the Department of Microbiology, Immunology & Pathology. Approximately 40 applicants to the CMB, MCIN, Biochemistry and Microbiology PhD programs attended the symposium in 2011. This past spring, 67 posters were presented. During this same weekend, faculty members matching the applicants' research interests interview prospective students. The applicants are afforded opportunities to meet with graduate students in the program at dinners organized by the CMB Student Association. For many of the applicants, the highlight of the visit is a snowshoeing trip in Rocky Mountain National Park.

Currently, 15% of the CMB Program students are members of underrepresented minorities. On average the CMB Program receives 80 applications each year. Of these we accept (offer acceptance to) an average of 20 students and enroll an average of 11 students (55% of those accepted). For students in the CMB Graduate Program, the average GPA is 3.6 and the average

GRE score is 1140/4. Clearly, the CMB program has a record of attracting strong applicants and enrolling them in our program.

In summary, by any measure the CMB Graduate Degree Program an unqualified success. Even so, room for improvements remains. High on the list of priorities is securing training grant funds for Ph.D. students and continuing to improve the CMB Graduate Program. We would like to thank everyone for all his or her contributions, faculty and students alike, toward making the CMB Program so successful.

CMB Budget 2011-2012

ALLOCATED TO CMB BUDGET

base budget	\$ 98,648
rollover/adjustments	\$12,100
GTA from Graduate School	<u>\$17,169</u>
TOTAL	\$127,210

EXPENDITURES

	Budgeted	Expended
ADMINISTRATION		
Director (2 months)	\$28,669	\$28,902
Administrative Asst III (10 months)	\$29,389	\$29,388
SEMINAR PROGRAM	\$12,800	\$10,530
TEACHING		
NB502/CM502	\$5,400	\$5,557
OFFICE OPERATIONS	\$6,683	\$11,958
copying, phone, postage, etc		
STUDENT STIPENDS/TUITION		
GTA (CVMBS)	\$17,169	\$12,734
STUDENT RECRUITMENT	\$9,300	\$11,555
EDUCATIONAL OUTREACH & INTERACTION	\$10,800	\$7,500
poster contest, research meetings, etc.		
CMB AWARD	\$7,000	\$7,106
TOTAL	\$127,210	\$125,230
Roll Forward		\$1,980

Annual CMB Budget for 2003 through 2011

	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12
Personnel	77,538	84,479	72,353	92,985	92,985	79,206	86,690	81,822	70,106
Operating Expenses	44,850	40,500	54,586	41,629	41,629	49,976	32,862	41,846	55,125
Total	122,388	124,979	126,939	134,614	134,614	129,182	119,552	115,959	125,230