Annual Report

2010

Life Sciences Education and Research

MichiganTech

The Biotechnology Research Center in 2010

The Biotechnology Research Center continues to attract faculty from a wide range of disciplines as evidenced by the addition of nine new members in 2010 (Jin Chen, Oliver Gailing, Mike Gibson, Elizabeth Hager, Wan Jin Jang, Adrienne Minerick, Karen Roemer, Ashutosh Tiwari and Le Zhang) from areas as disparate as mechanical engineering and exercise science. We welcome these new members, most of whom are beginning their careers as assistant professors at MTU, into our Center and look forward to many new ideas and innovations from them. Our Center continues the tradition of excellence in research, student training and outreach for the benefit of society and the environment with over $11.1 million in 57 research grants and contracts, with the major portion coming from the primary national funding agencies. The diversity of our research interests is reflected in the range of funding agencies including the National Science Foundation, National Institutes of Health, the United States Department of Agriculture, US Department of Energy, US Department of Defense, and the US Department of Education. This diversity is also reflected in the titles of the 60 research publications in 2010. The BRC has supported research infrastructure at MTU with expenditures of over $58,000 over the past two years to purchase instrumentation valued at more than $148,500. These funds have been primarily used by junior faculty to supplement start-up allocations. We have supported our 71 graduate students, 18 postdoctoral researchers/ research scientists and 70 undergraduate students with travel awards, fellowships and cash awards and prizes for outstanding presentations at our annual biotech exposition. Also, as part of our outreach activities this year, we provided summer research internships for 8 students and supported several seminar series. Infrastructure development and student training are core activities that exemplify our conviction to directly and effectively support life sciences research at MTU.

BRC 2010 at a Glance

41 Faculty members
18 Research scientists/associates
53 Ph.D. students
18 M.S. students
70 Undergraduate students
8 Summer Internships
60 Peer-reviewed publications
57 Active research projects
$4,146,840 New research funding
$11,187,844 Total research funding

Current BRC support team

Director
Michael R. Gretz

Staff Assistant
Mary Tassava

Executive committee
Martin Thompson (CSA*)
Victor Busov (SFRES)
Jeremy Goldman (COE)

Travel grant committee
Victor Busov (SFRES)
Rupali Datta (CSA)
Rupak Rajachar (COE)

Seminar committee
David Shonnard, Chair (COE)
Hairong Wei (SFRES)
Huann-Sheng Chen (CSA)
Leah Vucetich (SFRES)
Ashutosh Tiwari (CSA)

* COE: College of Engineering; CSA: College of Science and Arts; SFRES: School of Forest Resources and Environmental science

BRC Membership

BRC membership significantly increased in 2010 with the addition of 9 faculty from a wide range of disciplines across campus including biology, biomedical engineering, physics, mechanical engineering, forestry, math, chemistry, chemical engineering, exercise science and health. New members include Jin Chen (Assistant Professor, Chemistry), Oliver Gailing (Assistant Professor, Forestry), Kenneth M. Gibson (Professor, Dept. Chair, Biology), Elizabeth Hager (Research Assistant Professor, Biology), Wan Jin Jahng (Assistant Professor, Biology), Adrienne Minerick (Associate Professor, Chemical Engineering), Karen Roemer (Assistant Professor, Exercise Science and Health), Ashutosh Tiwari (Assistant Professor, Chemistry), Le Zhang (Assistant Professor, Mathematical Sciences). The BRC faculty currently has 40 members with Ryan Gilbert, Elizabeth Hager, Wenjin Ying and Xiaohong Zhu having left the university. Several faculty were honored with election/appointment to posts in national/international level science organizations. Our students were very successful at acquiring grants, fellowships and other honors based on their research productivity.

Current BRC Faculty Members

Susan Bagley	Professor, Biological Sciences
Lanrong Bi	Assistant Professor, Chemistry
Victor Busov	Associate Professor, SFRES
Jason Carter	Department Chair, Associate Professor, ESHPE
Huann-Sheng Chen	Associate Professor, Mathematical Sciences
Jin Chen	Assistant Professor, Chemistry
Qing-Hui Chen	Assistant Professor, ESHPE
Rupali Datta	Associate Professor, Biological Sciences
Seth Donahue	Associate Professor, Biomedical Engineering
Shiyue Fang	Assistant Professor, Chemistry
Megan Frost	Assistant Professor, Biomedical Engineering
Oliver Gailing	Assistant Professor, SFRES
Kenneth M. Gibson	Department Chair, Professor, Biological Sciences
Jeremy Goldman	Associate Professor, Biomedical Engineering
Michael Gretz	Director and Professor, Biological Sciences
Tammy Haut Donahue	Associate Professor, ME-EM
Patricia Heiden	Professor, Chemical Sciences
Caryn Heldt	Assistant Professor, Chemical Engineering
Wan Jin Jahng	Assistant Professor, Biological Sciences
Chandrashekhar Joshi	Professor, SFRES
Kim Fook Lee	Assistant Professor, Physics
Haiying Liu	Associate Professor, Chemistry
Adrienne Minerick	Associate Professor, Chemical Engineering
Pushpalatha Murthy	Professor, Chemistry
Keat Ghee Ong	Assistant Professor, Biomedical Engineering
Ching-An Peng	Professor/Mack Chair, Chemical Engineering
Rupak Rajachar	Assistant Professor, Biomedical Engineering
Karen Roemer	Assistant Professor, ESHPE
Qiuying Sha	Assistant Professor, Mathematical Sciences
Reza Shahbazian-Yassar	Assistant Professor, ME-EM
David Shonnard	Robbins Professor, Chemical Engineering
Mi Hye Song	Assistant Professor, Biological Sciences
Ashutosh Tiwari	Assistant Professor, Chemistry
Martin Thompson	Assistant Professor, Chemistry
Leah Vucetich	Research Assistant Professor, SFRES
Hairong Wei	Assistant Professor, SFRES
Thomas Werner	Assistant Professor, Biological Sciences
Ramakrishna Wusirika	Associate Professor, Biological Sciences
Le Zhang	Assistant Professor, Mathematical Sciences
Shuanglin Zhang	Professor, Mathematical Sciences

Research Scientists/Associates

1. Dr. Jennifer Adams, Postdoctoral Research Scientist (Vucetich)
2. Alexis Black, Postdoctoral Scientist (Thompson)
3. Dr. John Durocher, Research Assistant Professor (Carter)
4. Dr. Tatyana Georgieva, Research Scientist (Busov)
5. Dr. Jiqing Gou, Postdoctoral Scientist (Joshi/Busov/Wei)
6. Dr. Elizabeth Hager, Postdoctoral Research Associate (Gibson)
7. Dr. Robert Handler, Postdoctoral Scientist (Shonnard)
8. Rama Joshi, Research Associate (Joshi)
9. Dr. Sarah Kiemle, Postdoctoral Research Scientist (Gretz)
10. Jihe Li, Research Associate (Goldman)
11. Michael VanWagner, Research Technician (Rajachar)
12. Lindsey Wells, Technican/Lab Manager (Thompson)
13. Sheri Wiseman, Research Associate (Gibson)
14. Dr. Yordan Yordanov, Postdoctoral Research Scientist (Busov)
15. Dr. Elena Yordanova, Postdoctoral Research Scientist (Busov
16. Dr. Zhaogong Zhang, Postdoctoral Research Scientist (S Zhang)
17. Dr. Xiaohong Zhu, Research Assistant Professor (Joshi)
18. Dr. Shilei Zhu, Postdoctoral Associate (Liu)

Graduate Students (72)

Biological Sciences

1. Surendar Reddy Dhadi (Ph. D., Wusirika)
2. Nicholas Krom (Ph. D., Wusirika)
3. Deepak Kumar (M.S., Wusirika)
4. Kefeng Li (Ph. D., Wusirika)
5. Erin McKenney (M.S., Gretz)
6. Sheikh Rafi (Ph. D., Wusirika)
7. Zijun Xu (Ph. D., Wusirika**)**

Biomedical Engineering

8. Andrew DeRouin (M.S.,Ong)
9. Aytug Gencoglu (Ph.D., Minerick)
10. Stephanie Hamilton (Ph.D., Roemer)
11. Sean Hopkins (Ph.D., Frost)
12. Kaela Leonard (Ph.D., Minerick)
13. Matthew Nielsen (Ph. D., Frost)
14. Brandon Pereles (Ph. D., Ong)
15. Melissa Roberts (Ph. D., Goldman)
16. Katherine Synder (Ph.D., Rajachar)
17. Ee Lim Tan (Ph. D., Ong)
18. Chungja Yang (Ph.D., Minerick)
19. Christina Ylitalo (Ph.D., Haut-Donahue)
20. Peng Zang (Ph. D. Ong)

Chemistry Engineering

21. Felix Adom (Ph.D., Shonnard)
22. Zainab Alshoug (M.S., Shonnard)
23. Michael Brodeur-Campbell (Ph.D., Shonnard)
24. Jiqing Fan (Ph.D., Shonnard)
25. Aytug Gencoglu (Ph.D., Minerick)
26. Jordan Klinger (M.S., Shonnard)
27. Kaela Leonard (Ph.D., Minerick)
28. Jifei Liu (Ph.D., Shonnard)
29. Edwin Maleche (M.S. Shonnard)
30. Matt Mihalek (M.S., Shonnard)
31. Chungja Yang (Ph.D., Minerick)

Chemistry

32. Katrina Bugielski (M.S., Thompson)
33. Ning Chen (Ph. D., Heiden)
34. Xiaochu Ding (Ph. D., Heiden)
35. Suntara Fueangfung (Ph. D., Fang)
36. Steven Johnson (Ph.D., Murthy)
37. Ranae Kerr (Ph. D., Thompson)
38. Giri kumar (Ph. D., Liu)
39. Xi (Sissi) Lin (Ph. D., Fang)
40. Martha Meneses (Ph. D., Heiden)
41. Durga Pokhared (Ph.D., Fang)
42. Singaravelu Velayudham (Ph. D., Liu)
43. Zezhou Wang (Ph. D., Fang)
44. Jintao Zhang (Ph. D., Liu)
45. Xiang Zhang (Ph.D., Fang)

Electical Engineering

46. Michael Starrett (M.S., Frost)

Exercise Science, Health and Physical Education

47. Christopher Schwartz (Ph. D., Carter)
48. Sarah Stream (M.S., Carter)
49. Jennifer Witting (M.S., Carter)
50. Huan Yang (Ph. D., Carter)

Forest Resources and Environmental Sciences

51. Yiru Chen (Ph. D., Busov)
52. Jacob Ladd (Ph. D., Joshi)
53. Yang Li (M.S., Wei)
54. Jennifer Lind (Ph.D., Gailing)
55. Fang Ruan (Ph.D., Wei)
56. Aparupa Sengupta (M.S., Joshi)
57. Fuyu Xu (Ph. D., Joshi)
58. Hang Zhang (M.S., Wei)

Materials Science & Engineering

59. Connor McCarthy (M.S., Frost/Goldman)
60. Elizabeth Moore (M.S., Frost)

Mathematical Sciences

61. Heng Guo (M.S., Sha)
62. Shurong Fang (Ph.D., Sha)
63. Adan Niu (Ph. D., Sha)
64. Min Shu (Ph. D., Sha)
65. Shuaichen Wang (Ph. D., S Zhang)
66. Meifang Zheng (Ph. D., Sha)

Mechanical Engineering-Engineering Mechanics

67. Adam Abraham (Ph. D., Haut Donahue)
68. Megan Killian (Ph. D., Haut Donahue)
69. Duane Morrow (Ph. D., Haut Donahue)
70. John Moyer (M.S., Haut-Donahue)
71. Diego Villegas (Ph. D., Haut Donahue)

Undergraduate Students (70)

1. Nicole Adams, Biological Sciences (Gibson)
2. Matthew Alward, Chemical Engineering (Shonnard)
3. Kyle Andrews, Chemical Engineering (Shonnard)
4. Benjamin Baer, Biological Sciences (Wusirika)
5. Justeen Beaune, Forestry (Joshi)
6. Paige Beilfuss, Biological Sciences (Gibson)
7. Rebecca Boeve, Chemical Engineering (Shonnard)
8. Ian Bonner, Forest Resources & Environmental Science (Joshi)
9. Tyler Botbyl, Biomedical Engineering (Donahue)
10. Echoe Bouta, Biomedical Engineering (Goldman)
11. Devin Bremmeyr (Chemical Engineering)
12. Sam Bredeson, Biomedical Engineering (Ong)
13. Emily Brown, Biomedical Engineering (Goldman)
14. Beatrice Burgess, Biomedical Engineering (Frost)
15. Benjamin Cottrill, Biomedical Engineering (Frost)
16. Tyler Curtis, Biomedical Engineering (Frost)
17. Donisha Das, Biomedical Engineering (Rajachar)
18. Jamie Davis, Chemical Engineering (Shonnard)
19. Scott Docsa, Chemical Engineering (Shonnard)
20. Henry Durnwald, Biomedical Engineering (Frost)
21. Christian Edwards, Biomedical Engineering (Haut-Donahue)
22. Jessica Forrest, Biomedical Engineering (Rajachar)
23. Emily Geiger, Biological Sciences (Gibson)
24. Genevieve Gierke, Biomedical Engineering (Frost)

25. Gregg Hasman, Chemistry (Liu)
26. Richard Heglund, Biological Sciences (Gibson)
27. Kylin Hoehn, Biomedical Engineering (Frost)
28. Eric Hollenbeck, Forest Resources & Environmental Science (Joshi)
29. Hallie Holmes, Biomedical Engineering (Rajachar)
30. Trent Jansen, Biomedical Engineering (Goldman)
31. Christina Jufilack, Biomedical Engineering (Frost)
32. Nari Kang, Biological Sciences (Wusirika)
33. Alex Keim, Biomedical Engineering (Goldman)
34. Helena Keller, Chemical Engineering (Shonnard)
35. Michelle King, Exercise Science (Carter)
36. Jenna Klein, Exercise Science (Carter)
37. Jordan Klinger, Chemical Engineering (Shonnard)
38. Brigitte Koerner, Chemistry (Fang)
39. Henry Knoch, Mechinical Engineering-Engineering Mechanics (Haut-Donahue)
40. Kelsey Kusibab, Chemical Engineering (Shonnard)
41. Faith Lambert, Biological sciences (Gibson)
42. Cassandra Lindholm, Biological Sciences (Gibson)
43. Ashley Maes, Chemical Engineering (Shonnard)
44. Uziel Mendez, Biomedical Engineering (Goldman)
45. Alex Munguia, Chemical Engineering (Shonnard)
46. Chelsea Nikula, Chemistry (Thompson)
47. Amanda Nixon, Exercise Science Health & Physical Education (Roemer)
48. Kylin Nixon, Biomedical Engineering (Frost)
49. Matt Ogg, Biological Sciences (Wusirika)
50. Travis Olds, Chemistry (Fang)
51. Morgan Owen-Crruise (Chemistry)
52. Will Paces, Biomedical Engineering (Rajachar)
53. Kyrie Pappas, Chemistry (Fang/Murthy)
54. Carlos Prados, Biomedical Engineering (Minerick)
55. David Rosen, Exercise Science Health & Physical Education (Roemer)
56. Adam Sadhevandi, Chemical Engineering (Shonnard)
57. Hans Sandholm, Chemical Engineering (Shonnard)
58. Nicholas Schaug, Biomedical Engineering (Rajachar)
59. Aliabbas Sheraly, Chemical Engineering (Shonnard)
60. Justin Slis, Biomedical Engineering (Goldman)
61. David Smeenge, Biomedical Engineering (Frost)
62. Stephanie Smith, Biological Sciences, (Datta)
63. Talisha Sutton, Chemistry (Thompson)
64. Stephen Sweitzer, Biomedical Engineering (Ong)
65. Lilian Talla, Chemical Engineering (Shonnard)
66. Amanda Taylor, Chemical Engineering (Shonnard)
67. Juan Vargas, Chemical Engineering (Shonnard)
68. Charles Workman, Chemical Engineering (Shonnard)
69. Yao Xue, Electrical and Computer Engineering (Wei)
70. John Yurgil, Biomedical Engineering (Minerick)

Special Honors accorded to BRC Faculty Members

Jason Carter: Research Recognition Award from the Central Nervous System section of the American Physiological Society.

Jason Carter: Appointed to the Editorial Board for the American Journal of Physiology - Regulatory, Integrative, and Comparative Physiology.

Chandrashekhar Joshi: New patent approved: Isolated cellulose synthase promoter regions, Author: C. P. Joshi, Approved USA patent #7,674,951 on March 9, 2010.

Chandrashekhar Joshi: Invited as a World Class University Distinguished visiting Professor by Chonnam National University, Gwangju, Korea (2010-present).

Adrienne Minerick: *Won Best Paper Award from ASEE, New Engineering Educators*
Minerick, A.R. "Proposal Advice: Experiential Advice Focused for New Faculty," New Engineering Educators Division - American Society of Engineering Education Proceedings, 2010, Louisville, KY.

Martin Thompson: Elected Councilor of Upper Peninsula Section of the American Chemical Society.

Shuanglin Zhang: Endowed Richard and Elizabeth Henes Professorship.

Student Honors Received

Nari Kang (UG student): SURF Award (Wusirika)

Jenna C. Klein (UG student): Finalist for the David S. Bruce Excellence in Undergraduate Research Award from the American Physiological Society (Carter).

Amanda Nixon (UG student): Exercise Science: Summer Undergrad Research Fellowship from Michigan Tech (Roemer).

John Moyer, First place BS Student Paper Competition, American Society of Mechanical Engineering, Summer Bioengineering Meeting, naples, FL, June 2010 (Haut Donahue).

Christopher Schwartz (PhD student): Caroline tum Suden/Francis A. Hellebrandt Professional Opportunity Award from the American Physiological Society (Carter).

Sarah Stream (MS student): Caroline tum Suden/Francis A. Hellebrandt Professional Opportunity Award from the American Physiological Society (Carter).

BRC Student Support/Sponsored Activities

In FY10, the BRC continued its strong commitment to our graduate and undergraduate students by offering excellent research opportunities and financial support. BRC faculty members mentored many undergraduate students and continued to volunteer for outreach activities and Summer Youth Programs. BRC members are encouraged to reach out to both graduate and undergraduate students who are interested in the research being conducted at the Center. We have supported our 71 graduate students, 18 postdoctoral researchers/research scientists and 70 undergraduate students with travel awards, fellowships and cash awards and prizes for outstanding presentations at our annual biotech exposition. Also, as part of our outreach activities this year, we provided summer research internships for 8 students.

ESC/BRC Graduate Research Forum

The Sixth Annual Graduate Research Forum sponsored by the Biotechnology Research Center and the Ecosystem Science Center was held in March, 2010. Twenty BRC students –both graduate and undergrads - submitted abstracts and posters which highlighted their research.

2010 BRC Graduate Research Forum Award Recipients

$500 Grand Prize: **Eli Vlaisavljevich** (Biomed, Rajachar)

$100 Merit Awards: **Christopher Rivet** (Biomed, Gilbert)
Jonathan Zuidema (Biomed, Gilbert)

$50 Honorable Mention Awards:
Yiru Chen (SFRES, Busov)
Natalie Hartman (Biomed, Rajachar)
Sarah Kiemle (Biology, Gretz)

BRC Travel Grants

The Biotechnology Research Center continues to offer travel grants twice during the academic year to assist Michigan Tech undergraduate students, graduate students and post-docs who present their research at national or international conferences. 14 grants were awarded in FY10 totaling **$7,000**, and the breakdown by department was Biomedical Engineering – three, Exercise Science – two, Math – two, ME-EM – six, Physics – one.

2010 Travel Award Recipients

Adam Abraham ($500), ASME Summer Bioengineering Conference (ME-EM, Haut Donahue)
Echoe Bouta ($500), Molecular Mechanisms in Lymphatic Function & Disease Conference (Biomed, Goldman)
Rachel Bradford ($500), 31st American Society for Bone and Mineral (Biomed, Donahue)
Xiaoqi Cui ($500), ASHG/IGES Annual Meeting (Math, Chen)
Shurong Fang ($500), 2010 Joint Statistical Meeting (Math, Sha)
Connor McCarthy ($500), Molecular Mechanisms in Lymphatic Function & Disease Conf. (ME-EM, Haut Donahue)
Kasra Momeni ($500), 2010 MRD Spring Meeting Symposium (ME-EM, Yassar)
Duane Morrow ($500), ASME Summer Bioengineering Conference (ME-EM, Haut Donahue)
John Moyer ($500), ASME Summer Bioengineering Conference (ME-EM, Haut Donahue)
Saikat Mukhopadhyay ($500), American Physical Society 2010 Meeting (Physics, Pandey)
Anahita Pakzad ($500), Materials Research Society Conference (ME-EM, Yassar)
Christopher Schwartz ($500), Experimental Biology 2010 Conference (ESHPE, Carter)
Sarah Stream ($500), Experimental Biology 2010 Conference (ESHPE, Carter)
Eli Vlaisavljevich ($500) Orthopaedic Research Society Meeting (Biomed, Rajachar)

PhD Finishing Fellowships

The BRC Finishing Fellowships were established in 2008 to provide financial support to PhD students in their final year of their program. Applicants must have been supported by BRC affiliated external research grants for at least three years. Funding was set at $10K per year with two fellowships per year to be awarded. Applications are accepted on a continuous basis with fellowships being awarded as needed.

BRC Finishing Fellowships Awarded in FY10

Sarah Kiemle - $5,000 for the Spring, 2010 semester (Biology, Gretz)
Megan Killian - $5,000 for the Summer, 2010 semester (ME-EM, Haut Donahue)

Outreach/Summer Internships (8 Students)

1. Sean Duke, Mississippi State University (Minerick)
2. Kristen Reed, Kinesiology UG - University of Minnesota (Carter)
3. Kelly Lufkin, Exercise Science UG - Hope College (Carter)
4. Davy Sproule, Houghton High School (Carter)
5. Somya Gupta, High School Student (Joshi)
6. David Hofmann, Chemnitz University of Technology (Germany)
7. Lucia Qi, University of Notre Dame (Frost)
8. Chris Richter, Chemnitz University of Technology (Germany)

BRC supported seminars in FY2010

Dr. Dominique Loque from the Joint Bioenergy Institute in Emerville, Calilfornia gave a presentation on his research on lignin reduction as an aid for bioenergy formation in November, 2009.

Seed Grants for Infrastructure Improvement

The BRC has supported research infrastructure at MTU with expenditures of over $58,000 over the past two years to purchase instrumentation valued at more than $148,500. These funds have been primarily used by junior faculty to supplement start-up allocations. The guidelines established in FY06 require a 100% match from other funding sources. Funds remaining from the first cycle were rolled over to the second round. The infrastructure improvement grants are open to all departments represented by the members in the center. Requests for awards are accepted throughout the cycle with each group receiving equal funding amounts. Awards made in FY10 resulted in the purchase of new equipment worth $76,888. Members recently approved a third round of funding for infrastructure improvements at $90,000. Since the members are pleased with the guidelines already established, no changes were made in awarding grants.

Grant	Total Value	BRC Match	Department	Member
In Vivo Fluorescence Imaging (NIR Camera)	$37,750	$10,000	Biomed	Goldman
Leica Critical Drying Device	$9,500	$2,020	Biomed	Gilbert
Cyclic Pressure Control System	$18,850	$7,537	Biomed	Goldman
Rabbit Cages	$3,800	$1,900	ME-EM	Haut Donahue
Cryostorage Units	$2,419	$1,120	Biology	Hager
Digital Camera	$3,106	$1,553	SFRES	Busov, Joshi, Gailing, Wei
Database Server	$1,463	$730	SFRES	Wei

Financial Report

Our Center continues the tradition of excellence in research, student training and outreach for the benefit of society and the environment with over **$11.1 million in 57 research grants and contracts**, with the major portion coming from the primary national funding agencies.

In FY 2010:
Total research funds: $11,187,844
Active Research Projects: 57
New awards: 35 totaling $4,146,840
Total Research Expenditures: $2,215,178

FY10 Overhead Return Report

The Biotechnology Research Center continued to generate overhead dollars through external research grants. As per the BRC charter, the collected overhead return was distributed among the Center (10.7%), PIs (14% - not including the standard 6% incentive return). In FY10, BRC affiliated projects generated $613,234 in overhead. The distribution by academic unit is listed in the following table.

Table: Distribution of BRC Overhead Returns by the Unit in FY 09:

Unit	Total Overhead Generated from FY10 Report	14% Returned to PIs	10.7% Returned to BRC	Total 24.7%
Biology	$123,518	$17,293	$13,217	$30,510
Biomedical Engineering	$309,323	$43,306	$33,097	$76,403
Chemistry	$36,012	$5,042	$3,853	$8,895
Exercise Science	$45,863	$6,421	$4,907	$11,328
Mathematics	$15,995	$2,239	$1,712	$3,951
ME-EM	$21,993	$3,079	$2,353	$5,432
Physics	$0	$0	$0	$0
SFRES	$60,530	$8,474	$6,477	$14,951
Grand Totals	**$613,234**	**$85,854**	**$65,616**	**$151,470**

The diversity of our research interests is reflected in the range of funding agencies supporting BRC interests including the National Science Foundation, National Institutes of Health, the United States Department of Agriculture, US Department of Energy, US Department of Defense, and the US Department of Education. Follows is a list of BRC designated awards arranged by funding source.

Fang
$195,000; 03/07 – 02/11
Simple methods for oligonucleotide purification

Frost
$420,000; 08/09 – 4/12
Novel Photoinitiated Controlled Nitric Oxide Release Materials

Gretz
$131,000; 07/09 – 06/11
Evolution of the Land Plant Cell Wall: Functional Significance of Land Plant Polymers within the Charophycean Green Algae

Joshi
$741,877; 03/03 - 02/10
CAREER: Cellulose biosynthesis in aspen trees

Murthy, Thompson, Hungwe
$149,521; 01/09 – 12/11
Enhancing Active Learning: an Inquiry-Based Laboratory in Biomolecular Chemistry

Wenjun Ying
$183,444; 08/09 – 07/12
Adaptive Kernel-free Boundry Integral Method for Elliptic PDE's

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Bi
$202,263; 08/09 – 07/12
Enhancing the "Barcode" Readability of Color-Labeled Molecular Tags by Linker Engineering to Facilitate Genetic Analysis

Carter
$211,490; 2/08 - 1/11
Fish Oil and Neurovascular Control in Humans

Carter
$20,904; 8/09 - 1/11
Fish Oil and Neurovascular Control in Humans: Research Supplement to Promote Diversity in Health-Related Research

Carter
$232,500; 01/10 – 12/10
Sleep Deprivation and Neurovascular Control in Humans

Donahue
$238,428; 06/08 - 06/10
Black Bear Parathyroid Hormone as an Anabolic Agent for Bone

Donahue
$215,200; 04/09 – 03/12
Trabecular bone remodeling and mechanics in hibernating bears

Gibson
$53,628; 09/09 – 07/10
Therapeutic Biomarkers in Hyper IgD Syndrome (HIDS)

Gibson
$225,000; 1/06 - 12/10
Murine Knockout Model of 4-Hydroxybutyric Aciduria

Gibson
$100,000; 5/08 - 4/10
Murine Knockout Model of Mevalonic Aciduria

Gibson
$264,000; 12/08 - 11/13
Novel Treatment and Screening Strategies in Heritable Gamma-Hydroxybutyric Aciduria

Gibson
$17,200; 02/08 – 01/13
Behaviorial Pharmacology of GHB Physical Dependence

Gilbert
$234,000; 1/09-12/11
Acute Phase Treatment of Spinal Cord Injury with a Hydrogel Releasing Gluathone and Polyethylene Glycol

Gilbert
$388,708; 5/09-4/11
Development of Biomaterials that Release Therapeutic Agents to Modulate Inflammation Following Spinal Cord Injury

Goldman
$234,000; 09/08 – 08/11
The Regulation of VEGF-C by Interstitial Flow

Goldman
$422,284; 01/10 – 12/11
The Regulation of Interstitial Flow in Experimental Lymphedema by Compression

Haut Donahue
$206,654; 09/09 – 09/12
Structure and Function of Meniscal Horn Attachments

Jahng (Co-PI)
$1,073,651; 08-09
Mechanisms of Chondroprotection by Pomegranate Fruit Extract

Liu, Wei
$32,000; 04/08 – 07/09
Near-Infrared Nanopolymer Agents for Real-Time, In Vivo Imaging of Tumor Margins

Ong
$234,000; 04/08 - 03/11
An in-situ manometer for sphincter of Oddi Dysfunction Diagnostic

Thompson
$228,669; 08/07 – 07/11
Molecular recognition studies of human PB1 bromodomains

Zhang
$700,000; 08/05 - 07/10
Statistical Methods for Mapping Complex Disease Genes

United States Department of Agriculture

Busov (with Oregon State)
$320,000; 02/05-09/09
Field Evaluation of Semi-Dwarfism Transgenes for Biosafety of Transgenic Woody Plants

Busov, Wei
$900,000; 08/09-08/12
A system biology approach to elucidate regulation of root development in Populus

Busov
$429,999; 09/04 – 08/09
Efficiency of Activation Tagging for Functional Gene Discovery in Populus

Busov
$7,000; 10/09 – 09/10
McIntire Stennis: Gene Discovery for Enhanced Forest Health and Productivity

Gailing
$7,000; 10/09 – 09/10
McIntire Stennis: Study of genetic differentiation and local adaptation of Quercus rubra L. populations along an environmental cline using adaptive trait related genetic markers

Gretz
$56,261; 04/08 - 08/10
Physcomitrella as a heterologous expression system for investigating the functions of CESA-like gene products (w/ U. Rhode Island)

Joshi
$21,000; 08/08 - 07/11
McIntire Stennis: Tension Wood System

Wusirika
$100,000; 07/07 - 06/10
Identification and Characterization of Bidirectional promoters in the Rice Genome

Wei
$7,000; 10/09 – 11/10
McIntire Stennis: Identification of CIS-Elements Involved Stress Tolerance and Growth
From Gene Modules Derived From Networks

US Department of Defense

Gretz
$202,314; 07/09 – 07/11
Biofuels from Algae: Catalytic Domains on DNA Interweave Dimensional Arrays

Ong
$212,727; 09/09 - 04/11
US Department of Defense, Army, CDMRP; A wireless sensor system for real-time measurement of pressure profiles at lower limb prostheses to ensure proper fitting

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U.S. Department of Energy

Busov
$137,258; 11/07 – 11/09
Genome-enabled Modification of Poplar Root Development for Increased Carbon Sequestration

Busov
$70,704; 08/07 – 08/09
Genetic Modification of Gibberellic Acid Signaling to Promote Carbon Sequestration in Tree Roots and Stems

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U. S. Department of Education

Joshi
$224,000 (total funding about $1.1 million); 09/08 - 08/12
EU-US Transatlantic Masters degree program in Forest Resources (EU-USTMDPFR) Other collaborator Universities include North Carolina State University, NC (PI: Bronson Bullock); University of Helsinki, Finland (PI: Outi Orenius) and Swedish Agricultural University, Sweden (PI: Vilis Brukas)

Mayo Foundation for Medical Education and Research

Haut Donahue, **Odegard**
$221,000; 07/05 - 06/10
Microsensor for Intramuscular Pressure Measurement

National Institute for Occupational Safety and Health

Ong
$148,881; 08/09 - 07/11
A Wireless, Passive Dosimeter for Tracking Mercury Vapor Exposure

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American Physiological Society

Carter
$5,300; 5/09 - 4/10
Influence of Heat and Mental Stress on Neurovascular Control in Humans

Carter
$5,300; 5/10 - 4/11
Neural and Cardiovascular Responses to Anxiety Induced by Social Technology Removal

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Michigan Space Grant Consortium

Carter
$5,000; 5/10 - 4/11
Influence of Mental Stress on Sympathetic Baroreflex Function: Implications for Post-Spaceflight Orthostatic Intolerance

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The Consortium for Plant Biotechnology Research, Inc.

Joshi (with ArborGen and DOW)
$340,000; 12/08 - 04/10
Genetic master switches controlling cellulose biosynthesis in plants

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Michigan Universities Commercialization Initiative

Fang
$66,000; 01/08 – 01/11
Simple Methods for Oligonucleotide Purification

Michigan Technological University

Bi
$39,000; 07/08 – 01/11
REF seed grant: High Fidelity DNA Sequencing using Solid Phase Capturable Dideoxynucleotides and MALDI-TOF Mass Spectrometry.

Datta
$16,498; 04/09 - 06/10
Biochemical and molecular mechanisms behind lead accumulation in Vetiver grass

Roemer
$ 26,700; 7/09 - 8/10
Research Excellence Fund; Biomechanical Analysis of Movements in Obese and Overweight People

Sha
$8,661; 07/09 – 12/10
REF; Identify gene-gene interactions in genome-wide association studies

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Portage Sports Medicine Institute

Carter
$10,000; 9/08 -08/10
Aerobic Capacity of Elite Collegiate Hockey Players: Sport Specific Assessment

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CFDRE

Liu
$32,648; 04/08 – 07/09
Agents In Vivo Tumor Imaging

Aursos Inc.

Donahue
$160,172; 02/08-05/11
In Vivo and in Vitro Effects of Bear PTH 1-34

Arch Personal Care Products

Wusirika
$37,000 09/09 – 08/10
Pilot Scale Production and Delivery of Rice Callus Ferment Extract

South Florida Water Management District

Gretz
$15,000; 05/10 – 09/10
Determination of Polysaccharide Biomarkers from Macrophytes in Detrital Floc

Peer-reviewed Publications in 2010 (Bold = BRC Faculty)

Acosta MT, Munasinghe J, Pearl PL, Gupta M, Finegersh A, **Gibson KM**, Theodore WH. (2010) Cerebellar Atrophy in Human and Murine Succinic Semialdehyde Dehydrogenase Deficiency. Journal of Child Neurology. [Epub ahead of print]

Ayele Bekele T, **Gailing O** and Finkeldey R (2010) Conservation genetics of *Hagenia abyssinica* (Bruce) J.F. Gmel: a remarkable but gravely endangered tropical tree species. Journal for Nature Conservation. doi:10.1016/j.jnc.2010.03.001.

Bellinger, BJ, **Gretz, MR**, Domozych, D, Kiemle, S and Hagerthy, S. 2010. The composition of extracellular polymeric substances from periphyton assemblages in the Florida Everglades. Journal of Phycology 46:674-678.

Bellinger, BJ, Underwood, G.J.C., Ziegler, S.E. and **Gretz, MR** 2009. The significance of diatom-derived polymers in carbon flow dynamics within estuarine biofilms determined through isotopic enrichment. Aquatic Microbial Ecology 55:169-187**.**

Bi W, Bi Y, Xue P, Zhang Y, Gao X, Wang Z, Li M, Baudy-Floc'h M, Ngerebara N, **Gibson KM**, Bi L (2010) Synthesis and characterization of novel indole derivatives reveal improved therapeutic agents for treatment of ischemia/reperfusion (I/R) injury. J Med Chem. 53(18):6763-7.

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Carter JR, Klein JC, and Schwartz CE (2010) Effects of oral contraceptives on sympathetic neural responses to orthostatic stress in young, healthy women. American Journal of Physiology - Regulatory, Integrative, and Comparative Physiology. 298:R9-R14.

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Chen QH and Toney GM (2010) In vivo discharge properties of hypothalamic paraventricular nucleus neurons with axonal projections to the rostral ventrolateral medulla. Journal of Neurophysiology . 103(1):4-15.

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Domozych, DS,. Lambiasse, L, Kiemle, SN. and **Gretz, MR** 2009. Structure and biochemistry of charophycean cell walls. II. Cell wall development and bipolar growth in the desmid Penium margaritaceum. Asymmetry in a symmetric world. Journal of Phycology 45:894-897.

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