

University of Arkansas, Fayetteville

ScholarWorks@UARK

Vice Provost for Research and Economic
Development Annual Report

Research and Innovation

2013

Annual Report, 2012-2013

University of Arkansas, Fayetteville. Office of the Vice Provost for Research and Economic
Development

Follow this and additional works at: <https://scholarworks.uark.edu/research-economic-development-annual>

Citation

University of Arkansas, Fayetteville. Office of the Vice Provost for Research and Economic Development. (2013). Annual Report, 2012-2013. *Vice Provost for Research and Economic Development Annual Report*. Retrieved from <https://scholarworks.uark.edu/research-economic-development-annual/3>

This Periodical is brought to you for free and open access by the Research and Innovation at ScholarWorks@UARK. It has been accepted for inclusion in Vice Provost for Research and Economic Development Annual Report by an authorized administrator of ScholarWorks@UARK. For more information, please contact ccmiddle@uark.edu.



*Office of the Vice Provost for
Research & Economic Development*

Annual Report 2012-2013

Table of Contents

Executive Summary.....	3
Office of the Vice Provost for Research and Economic Development.....	4
Research and Sponsored Programs.....	6
Research Compliance.....	8
Technology Ventures.....	11
Entrepreneurship.....	14
Arkansas Center for Space and Planetary Sciences.....	16
University of Arkansas Press.....	19
Arkansas High Performance Computing Center.....	20

Executive Summary

Total external support for sponsored activities in FY2013 was \$63,342,744, an overall decrease of 8.5% from the previous year. RSP awards were \$44,996,645 (-5.6%). Division of Agriculture awards were \$18,346,099 (-15.6%). Proposal submissions were higher in FY13 than in both FY12 and FY11.

The Technology Licensing Office was split into campus and division units. The campus unit has been rebranded as Technology Ventures.

Several policy changes were implemented during the year. The faculty promotion and tenure checklists had Intellectual Property activity added as a criteria to be considered. The Conflict of Interest policy was revised to meet the updated Public Health Service requirements.

RSP implemented the Quali-Coeus (KC) electronic research office management system, renamed RazorGrant. RazorGrant uses electronic proposal storage and approval routing, and internal review. Grants specialists are no longer using paper files for most proposals.

FY13 licensing revenues of \$298,934 and reimbursement of patenting costs of \$355,023 were realized.

Since 2009, UA has won 19 national/international business plan competitions, twice as many as the next closest competitor (the University of Louisville, with 9). UA Teams have also placed in the finals at 19 additional competitions, seven ahead of the next closest university, Johns Hopkins. University of Arkansas teams have won over \$2 million in cash prizes since 2002.

Forty-five faculty members and administrators from four Arkansas research universities (UAF, UAMS, UALR, and ASU) attended a three-day commercialization retreat organized and hosted by the Office of Entrepreneurship in July 2012.

The Arkansas Space and Planetary Science Center received two new NASA research grants totaling \$728,703. These help support three Space Center graduate students.

The University of Arkansas Press current best-sellers include *John McDonnell* and *Arkansas: A Narrative History, 2nd Edition*. Each has nearly three thousand copies in print.

Arkansas High Performance Computing Center had 159 active users in twenty departments across four UA colleges and units. AHPCC also supported research collaborations at UALR, UAPB, ASU, West Virginia University, and two research institutions in Europe and Asia.

AHPCC users had \$28.7M in active research grants and contracts including two major NSF infrastructure grants totaling \$2.6M for machine room renovations and computing equipment.

Office of the Vice Provost for Research and Economic Development

The Office of the Vice Provost for Research and Economic Development worked with the Executive Committee and Deans to finalize the UA Interdisciplinary Research Strengths. These strengths include: Health, Energy and the Environment, Nano/Advanced Materials, Food Safety, Transportation and Logistics, and American Art, Architecture, and Humanities. In addition, four cross-cutting activities were identified. These are Entrepreneurship, High Performance Computing, Sustainability, and International Relations.

The VPRED office initiated or continued several different programs in FY13 to enhance the research enterprise. The use of the UA aircraft to transport faculty to DC to meet with federal agency sponsors was continued. These trips have been very important in allowing faculty to present their research ideas to program directors and receive feedback on their viability and how to refine the proposal.

There were several staff changes during the year. Dr. Dennis Brewer who had been serving as Associate Vice-Provost and Director of RSSP became the new Associate Vice Chancellor for Information Technology. Dr. Cynthia Sagers, Professor of Biological Sciences, accepted the role of interim Associate Vice-Provost for Research and Economic Development. Kathy Scheibel, Associate Director of RSSP, became interim co-Director of RSSP along with Dr. Rankin. Dr. Sean Mulvenon, Director of NORMES and Professor of Education Statistics, became the Director of Research Assessment and Promotion.

The Technology Licensing Office was split into campus and division units. The campus unit has been rebranded as Technology Ventures. Jeff Amerine was named as the Director of Technology Ventures. Susie Engle was promoted to Commercialization Manager and Mark Swaney is also a Commercialization Manager. A new customer-friendly approach has been successful in working with faculty and industry representatives.

The federal lobbying effort was continued in FY13. Since the House Republicans continued their "No Earmarks" policy in FY13, the lobbying effort was focused on 1) representing UA research to federal agencies, and 2) working with the congressional delegation to support programs of interest to UA. The university lobbyist traveled to campus to meet with faculty in October 2012. A book of UA research interests was provided to each member of the delegation.

An Arts and Humanities Seed Funding program was initiated in the VPRED office this year. Faculty from all UA colleges were invited to submit a brief proposal on an arts and humanities related project. The project was limited to tenured and tenure-track faculty and the criteria were to improve the national reputation of the faculty member and the University. Each budget was capped at \$5,000.

The SEC announced a faculty travel grant program for FY13 and FY14. The program allowed each awardee to use up to \$2,500 to travel to another SEC campus to facilitate collaboration.

Each campus was allowed to select four awards. The VPRED office served as the campus organization in charge of this initiative.

Several policy changes were implemented during the year. The faculty promotion and tenure checklists had Intellectual Property activity added as a criteria to be considered. The Conflict of Interest policy was revised to meet the updated Public Health Service requirements.

Research and Sponsored Programs

The Office of Research Support and Sponsored Programs (RSSP) accepted a total of 393 awards from various sponsors during FY2013. Total sponsor awards administered by RSSP for FY2013 was \$44,996,645 representing a decrease of 5.6% compared to FY2012. The Division of Agriculture administered research support in the amount of \$18,346,099 representing a decrease of 15.6%. As shown in Table 1, University of Arkansas external support for sponsored activities received in FY2013 was \$63,342,744, an overall decrease of 8.5% from the previous year.

Table 1: Summary of Awards FY04 to FY13 – Includes the Division of Agriculture										
Unit	FY2004	FY2005	FY2006	FY2007	FY2008	FY2009	FY2010	FY2011	FY2012	FY2013
ADMIN	3,646,135	3,047,822	5,641,669	5,118,183	4,130,794	4,148,068	6,521,614	5,297,357	4,228,831	3,882,716
AFLS	15,193,476	17,335,331	14,931,201	13,696,441	15,930,946	20,007,692	21,290,763	25,573,607	25,618,983	20,957,305
ARDO	527,989	1,433,944	1,778,349	1,043,038	586,961	855,246	468,085	191,493	95,720	33,825
ARSC	27,408,401	20,634,520	19,886,493	17,220,638	19,891,658	21,308,726	21,858,369	18,666,359	14,662,942	13,438,270
EDUC	6,494,183	5,348,988	7,676,504	6,368,064	7,372,031	7,176,954	8,698,295	8,226,951	11,338,163	14,148,152
ENGR	7,466,224	10,399,587	20,994,561	10,992,697	17,935,215	8,755,641	19,326,484	15,474,529	10,528,923	9,981,270
GRAD	176,346	197,136	615,541	1,527,150	436,831	649,833	3,477,614	490,240	348,475	232,121
HNRC	-	-	-	-	-	-	-	-	-	-
LAW	222,180	39,744	46,510	117,853	87,529	11,000	39,744	39,412	39,744	50,000
MULN	-	30,000	-	-	-	-	-	-	5,590	152,399
VPRS	-	-	-	-	-	-	-	-	-	-
WCOB	1,549,525	1,135,109	775,381	1,004,007	918,644	1,197,457	618,478	640,988	1,868,823	466,686
Total	62,684,459	59,602,181	72,346,209	57,088,071	67,290,609	64,110,617	82,299,446	74,600,936	68,736,194	63,342,744

Note: ADMIN includes AVCB, Clinton, UDEV, VPDV, VPRS, & VPSA

The composition of total FY2013 awards is \$25,598,220 (40.4%) from federal sources, \$11,511,389 (18.17%) from state sources, and \$26,233,135 (41.4%) from other sources such as industry and private foundations. These amounts are summarized by unit in Table 2.

Table 2: Summary of Awards by Funding Source - By Unit				
Unit	Federal	State	Other	Total
ADMIN	3,757,666	5,365	119,685	3,882,716
AFLS	5,430,035	400,405	15,126,865	20,957,305
ARDO	-	24,500	9,325	33,825
ARSC	7,556,263	1,929,149	3,952,858	13,438,270
EDUC	2,488,508	6,566,424	5,093,220	14,148,152
ENGR	6,038,627	2,182,985	1,759,658	9,981,270
GRAD	232,121	-	-	232,121
HNRC	-	-	-	-
LAW	-	50,000	-	50,000
MULN	-	-	152,399	152,399
VPRS	-	-	-	-
WCOB	95,000	352,561	19,125	66,686
Total	25,598,220	11,511,389	26,233,135	63,342,744

Proposal Development and Submission

RSSP assisted with the development and submission of 815 proposals and requests for continuation, exclusive of requests for no-cost extensions, in FY2013. The number of proposal submissions to all sources increased by 19.3% over the previous fiscal year. Total funds requested were \$183,186,279. This includes requests of \$125,896,941 (68.7%) for federal funding, \$27,951,565 (15.3%) for state funding and \$29,337,773 (16%) for other types of funding.

RSSP Highlights for FY2013

In 2011, the Office of Research and Sponsored Programs conducted a Proof-of-Concept (POC) for the Quali-Coeus (KC) electronic research office management system. The goal of the POC was to assess the feasibility of implementing KC. In 2012, the system, renamed RazorGrant, has been implemented within RSSP for electronic proposal storage and internal review. Grants specialists are no longer using paper files for most proposals.

The next phase of RazorGrant implementation will replace the routing and disclosure forms currently in use. The department and college approval hierarchy has been implemented within the web interface so that proposals are automatically routed to the appropriate administrative office depending on the investigators involved. RSSP has written an extensive collection of training materials to help with the roll-out to other units. The Department of Chemical Engineering, and later the College of Engineering, will serve as the initial adopters of routing and approval workflow process.

Research Compliance

- Assisted with the completion of new policies relating to both sponsored and unsponsored research activities —
 - *Protection of Human Subjects in Research Policy & Procedures Manual* which was approved unanimously by the Institutional Review Board members attending the June 2013 meeting. The Draft will be submitted to the Executive Committee for final approval in FY14.
 - UA Policy 404.0, *Conflict of Interest and Conflict of Commitment, Including Outside Activity* received final approval and was implemented in August, 2012.
- Fully implemented *Guide for the Care and Use of Laboratory Animals* (8th ed.), National Research Council of the National Academies, including the completion of Disaster and Emergency Preparedness Plans for all animal facilities supervised by the Institutional Animal Care and Use Committee.
- Completed export classification assessments for one research facility, all CISCO products used by Information Technology Services (ITS), and eleven laboratories.
- Renewed UA Registration as a defense contractor to the Department of Defense Trade Controls.
- Sponsored three Federal Bureau of Investigation (FBI) threat update briefings.

FY13 Human Subjects Research Protocol Activity	
<i># of New Protocols</i>	<i>Type of Review</i>
574	Exempt
132	Expedited
28	Full Board
3	Administrative – determined not to be human subjects research
<i># of Protocol Modifications</i>	<i>Type of Review</i>
157	Exempt
99	Expedited
4	Full Board
<i># of Protocol Extensions</i>	<i>Type of Review</i>
157	Exempt
61	Expedited
14	Full Board

No reportable Adverse Events were reported in this fiscal year.

Biosafety Committee (IBC)

FY13 Biological Safety Committee Research Protocol Activity	
New Protocols	31
Protocols Renewals	24
Protocol Modifications	10

Institutional Animal Care and Use Committee (IACUC)

FY13 IACUC Research Protocol Activity	
<i># of New Protocols</i>	<i>Type of Review</i>
45	Full Committee
18	Expedited Review
<i># of Modification Requests</i>	<i>Type of Review</i>
25	Full Committee
19	Expedited Review

Semi-annual facilities and program reviews were conducted on December 7, 2012 and June 14, 2013. There were no findings of significant noncompliance and no dissenting opinions offered. The IACUC participated in the development of Disaster and Emergency Preparedness Plans for the Central Laboratory Animal Facility, Engineering Research Center animal room, Ferritor Hall animal holding rooms, and animal holding rooms in Science Engineering and the Science Buildings.

Radiation Safety Committee (RSC)

The RSC met six times in FY13. The Arkansas Department of Health performed its annual inspection in March. For the first time since 2004, no items of non-compliance were found.

Toxic Substances Committee (TSC)

No meetings were scheduled for the TSC in FY13.

Conflict of Interest and Commitment Review Committee (CICRC)

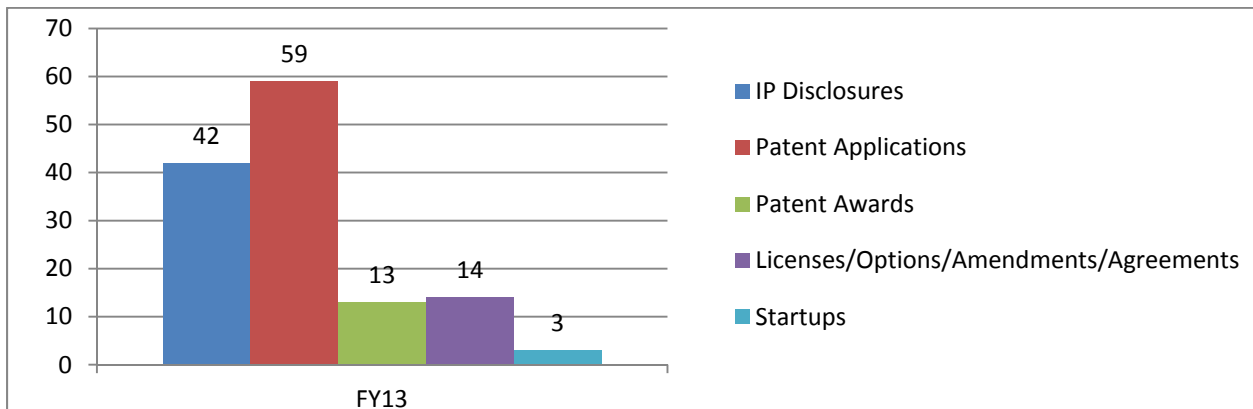
The CICRC met once in FY13 to review a potential conflict of interest disclosed by a UA employee. In agreement with the Dean, Department, and Vice Provost for Research and Economic Development, the committee found that disclosed activity was unacceptable. The employee was informed of the committee’s decision and the right to appeal in accordance with UA Policy 404.0.

Technology Ventures

The Technology Ventures team plays the lead role in the commercialization of world-class University of Arkansas intellectual property through aggressive researcher, student, community, and industrial engagement. During the course of fiscal year 2013, Technology Ventures was created from the former Technology Licensing Office that historically jointly served the Division of Agriculture and the University of Arkansas Fayetteville campus. The rebranding reflects a heightened focus on improving stakeholder engagement and service. The Technology Ventures' team consists of three professionals. The team is led by a director and supported by two experienced commercialization managers.

Key performance metrics for Technology Ventures in fiscal year 2013 are shown in the graph below. These metrics highlight a record number of invention disclosures (42) and patent applications (59).

Metrics



* Numbers above are for combined UA Technology Ventures and Division Technology Commercialization for 2013

For fiscal year 2013, licensing revenues of \$298,934 and reimbursement of patenting costs of \$355,023 were realized. The team is very focused on driving new sources of license and soft funding from multiple domestic and international sources going into fiscal year 2014.

In addition to advancing the core commercialization performance metrics shown above, the Technology Ventures team helped accelerate the regional and state economic development agenda by active leadership in the development of the programs, events, and networking required to sustain an innovation-driven venture ecosystem.

Programs

Technology Ventures served as the UA lead for the much heralded ARK Challenge Accelerator program. The program is jointly managed by Winrock International and the University of Arkansas and resulted from being selected by the Department of Commerce from a field of 125 national proposals. The objective of the program is to develop startups that provide needed solutions in mobile and cloud-based computing for retail, transportation/logistics, and food processing. The format of the program is a boot camp that compresses 1-2 years of startup development into 14 weeks. When the teams leave the program they have beta customers, a minimum viable product/service, and are seed-investment ready. The ARK is a public/private partnership that has included over \$1 million in federal funding, in-kind matching support, and \$1.1 million in private investment funding. This program launched 15 new technology companies from the first cohort that ran from August through November 2012. Six of the companies from the first cohort have received additional rounds of finance. The teams in the first cohort came from Arkansas, Missouri, Florida, California, Singapore, New York, and India.

The second cohort launched with 9 companies in June 2013. The companies were chosen from 93 applications from 14 countries. The 9 selected companies have representation from Arkansas, India, Argentina, and Uruguay.

Outreach Events and Networking

During the course of fiscal year 2013, Technology Ventures played a central role in advancing the statewide and regional economic development agenda. These activities included but were not limited to support for the Commercialization Retreat in July 2012, TEDx Bentonville, bi-monthly Natural State Angel Association meetings, recurring G60 Elevator Pitch Contests, the DWR Governor's Cup Competition, along with numerous community speaking engagements to promote the importance of creating and supporting a strong venture/startup ecosystem in Arkansas.

Researcher Engagement

To improve researcher engagement, Technology Ventures held an Inventor Awards Banquet and supported the University of Arkansas becoming a charter member of the National Academy of Inventors. During the event, researchers who had received patents were recognized with plaques memorializing their important achievements.

The Technology Ventures' team began in January holding monthly UA inventor lunches to raise awareness of intellectual property management and to expand and improve relationships within our most important constituency.

Other important engagement initiatives have included a comprehensive overhaul of the Technology Ventures website which dramatically improved ease of use and relevance. Going into fiscal year 2014 monthly email blasts will also be used to ensure increased awareness in key commercialization issues is raised amongst faculty and administration.

Entrepreneurship

Student Achievements

Four teams competed and won \$386,000 in cash prizes – the most ever for University of Arkansas teams in a single season

1st school in history to have four different teams qualify to compete at the Venture Labs Investment Competition

1st, 2nd, 3rd and innovation awards at Arkansas Governor's Cup competition

1st place, MIT Clean Energy Competition (Picasolar)

1st place, Ivey (U of Western Ontario) Business Plan Competition (Picasolar)

1st place, New Venture Challenge (U of Nebraska) Business Plan Competition (HomeDx)

1st place, Banana Republic Grad Student Challenge (Picasolar)

1st place, LES Global Business Plan Competition (ParadigMed)

2nd place and Elevator Pitch Winner, Donald W. Reynolds Tri-State Competition (HomeDx)

3rd place, New Venture Championship (U of Oregon) (Picasolar)

2nd and 3rd places, Gone in 60 Seconds Elevator Pitch Competition (Picasolar and HomeDx)

3rd place and Elevator Pitch Winner, Stu Clark Business Plan Competition (University of Manitoba) (Picasolar)

3rd place, Cardinal Challenge (University of Louisville) (EverClean Coating Solutions)

4th Place, University of Cincinnati Business Plan Competition (ParadigMed)

Finalist (advanced through regional win), DOE National Clean Energy Competition (Picasolar)

Finalist (advanced through regional win), Walmart Better Living Business Plan Competition (EverClean Coating Solutions)

Picasolar and HomeDx are continuing operations, ParadigMed's product is being advanced by the inventor's startup, and EverClean Coating Solution's IP (owned by the UA) may be licensed to another solar startup.

Long-term results

Since 2009, the University of Arkansas has won 19 national/international business plan competitions, twice as many as the next closest competitor (the University of Louisville, with 9). UA Teams have also placed in the finals at 19 additional competitions, seven ahead of the next closest university, Johns Hopkins. University of Arkansas teams have won over \$2 million in cash prizes since 2002.

Ten start-ups have come out of the UA entrepreneurship program in the past five years. These start-ups employ approximately 100 Arkansans in high-wage jobs. They have raised over \$18 million in private funding and government grants and incentives. In addition, six technologies that were the basis of UA student competition teams are being developed by other startups in the state. UA entrepreneurship students are an integral part of the rapidly developing entrepreneurial ecosystem in NWA.

Other initiatives:

Forty-five faculty members and administrators from four Arkansas research universities (UAF, UAMS, UALR, and ASU) attended a three-day commercialization retreat organized and hosted by the Office of Entrepreneurship in July 2012. The retreat was very highly regarded by the participants and a second retreat has been planned for July 2013. This retreat will be attended by 45 new participants, who will be joined by 15 alumni for the last day of the retreat.

Arkansas Center for Space and Planetary Sciences

2012 – 2013 has been a year of many accomplishments for the Arkansas Center for Space and Planetary Sciences (the Space Center) as it continued producing results that are helping the University of Arkansas move toward becoming a Top 50 Public University with a Carnegie research classification of very high activity. It did this by providing high-quality research and educational opportunities for its graduate and undergraduate students in a truly diverse and interdisciplinary environment. The Space Center serves two distinct but interrelated roles at the University. It is a research center which maintains facilities, equipment, instrumentation, and computers for interdisciplinary research over a wide range of space and planetary sciences. Additionally, the Space Center administers the interdisciplinary graduate degree programs in Space and Planetary Sciences (SPAC), created in AY 2006. Education and outreach are also important parts of the Center's activities.

During AY 2013, at least 28 articles, and three invited book chapters were published in refereed scholarly journals or books, including one in *Science* and two in *Geophysical Research Letters*. In addition, at least 14 invited talks, eight other articles, and 43 other presentations were given at major national and international conferences, workshops, or other universities based on scholarly research in the Space Center. Previously funded NASA and NSF research grants totaling \$1,736,885 supported several Space Center graduate students or faculty throughout AY 2013. Two new NASA research grants totaling \$728,703 were funded during the academic year and now support three Space Center graduate students. Another new NASA grant for \$670,613 was awarded to Professor Dan Lessner of the Biological Sciences department, who officially became active in the Space Center in the last year by becoming the research mentor of first-year Ph.D. student Ryan Sheehan. With Professor Lessner's total grant support of more than \$1.28M in the area of astrobiology, we anticipate recruiting future Space Center students to work under his direction. Smaller grants from the ASGC, NSF, and other sources totaling \$53,530 were also active during the year supporting Space Center research activities. Thus, the Space Center enjoyed active research grants totaling more than \$2.5M in AY 2013 with another new NASA grant of \$670,613 that we hope will also support new graduate students soon. Note, these numbers combine for nearly \$3.2M and represent a significant increase (78%) over the previous year in total funding supporting the Space Center.¹ Finally, it should be noted that eight Space Center proposals totaling nearly \$2.5M were still pending on June 30, 2013.

¹ The figures reported on this page do not reflect grants totaling \$641,450 that were transferred to another university by Dr. Fang-Zhen Teng when he departed from the University of Arkansas on December 31, 2012. None of his funds supported Space Center graduate students during AY 2013.

Refereed Journal Articles

1. Peter Jenniskens, ..., Robert Beauford, et al., "Radar-Enabled Recovery of the Sutter's Mill Meteorite, a Carbonaceous Chondrite Regolith Breccia," *Science* **338**, 1583 (21 December 2012).
2. Joel C. Berrier and Jeff Cooke, "Close Galaxy Pairs at $z = 3$: A Challenge to UV Luminosity Abundance Matching," *MNRAS* **406**, No. 2, 1647 – 1662 (October 2012).
3. Ehlmann, B. L., Berger, G., Mangold, N., Michalski, J. R., Catling, D. C., Ruff, S. W., Chassefière, E., Niles, P. B., Chevrier, V. F., Poulet, F., "Geochemical Consequences of Widespread Clay Mineral Formation in Mars' Ancient Crust," *Space Science Reviews* **174**(1-4), 329 – 364 (December 2012).
4. Mousis, O., Chassefiere, E., Lasue, J., Chevrier, V.F., Elwood-Madden, M., Lakhlifi, A., Lunine, J.I., Montmessin, F., Picaud, S., Schmidt, F., Swindle, T.D., "Volatile trapping in martian clathrates," *Space Science Reviews*, **174**(1-4), 213 – 250 (December 2012).
5. ElShafie, A., Chevrier, V. F., Dennis, N., "Application of planetary analog mechanical properties to subsurface geological investigations," *Planetary and Space Science* **73**(1), 224 – 232 (December 2012).
6. Chevrier, V. F. and Rivera-Valentin, E. G., "Formation of Recurring Slope Lineae by Liquid Brines on Present-day Mars," *Geophys. Res. Lett.* **39**(21), doi: 10.1029/2012GL054119, (November 2012).
7. Luspay-Kuti, A., Chevrier, V.F., Wasiak, F., Roe, L.A., Welivitiya, W.D.D.P., Cornet, T., Singh S., Rivera-Valentin, E.G., "Experimental Simulations of CH₄ Evaporation on Titan," *Geophys. Res. Lett.* **39**(L23203), doi: 10.1029/2012GL054003 (December 16, 2012).
8. Dorn, R.I., Gordon, S., Allen, C.D., Cervený, N., Dixon, J.C., Groom, K.M., Hall, K., Harrison, E., Mol, L., Paradise, T.R., Sumner, P., Thompson, T., Turkington, A.V. 2013. "The role of fieldwork in rock decay research: Case studies from the fringe," <http://dx.doi.org/10.1016/j.geomorph.2012.12.012>, Published online by *Geomorphology* 22 December 2012.
9. P. Treuthardt, M.S. Seigar, A.D. Sierra, I. Al-Baidhany, H. Salo, D. Kennefick, J.D. Kennefick, C.H.S. Lacy, "On the link between central black holes, bar dynamics and dark matter haloes in spiral galaxies," *Monthly Notices of the Royal Astronomical Society* **423**, (4), 3118-3133 (July 2012).
10. C.P. McKay, B.N. Khare, R. Amin, M. Klasson, and T.A. Kral, "Possible Sources for Methane and C₂ – C₅ Organics in the Plume of Enceladus," *Planetary and Space Science* **71** (1), 73 – 79 (October 2012).
11. Lacy, C. H. S., "New Times of Minima of Some Eclipsing Variables," *International Bulletin on Variable Stars*, No. 6014 (2012).
12. Lacy, C.H.S., Fekel, F.C., and Claret, A. , "Absolute properties of the eclipsing binary star V335 Serpentis," *Astronomical Journal* **144** (2), 63 (August 2012).
13. Gietzen, K.M., Lacy, C.H.S., Ostrowski, D.R., & Sears, D.W.G., "IRTF observations of S complex and other asteroids: Implications for surface compositions, the presence of clinopyroxenes, and their relationship to meteorites," *Meteoritics and Planetary Science* **47**, 1789 – 1808 (November 2012).
14. Lacy, C.H.S., Torres, G., & Claret, A., "Absolute Properties of the Triple Star CF Tauri," *Astronomical Journal* **144**, 167 (November 2, 2012).

15. A.J. Horne and D.J. Lessner, "Assessment of the oxidant tolerance of *Methanosarcina acetivorans*," *FEMS Microbiol. Lett.* **343**(1): 13 – 19 (June 2013).
16. M. Telus, N. Dauphas, F. Moynier, F.-Z. Teng, P.I. Nabelek, P.R. Craddock, and L.A. Groat, "Iron, zinc and magnesium isotopic fractionation during continental crust differentiation: The tale from migmatites, granites and pegmatites," *Geochimica et Cosmochimica Acta* **97**, 247 – 265 (November 15, 2012).
17. W. Yang, F.-Z. Teng, H.-F. Zhang and S. Li, "Magnesium isotopic systematics of continental basalts from the North China craton: Implications for tracing subducted carbonate in the mantle," *Chemical Geology* **328**, 185 – 194 (October 18, 2012).
18. E.G. Rivera-Valentin, D.G. Blackburn, and R.K. Ulrich, "Exploring the effects of overburden on the sublimation and transport of H₂O on Iapetus," *Icarus* **220** (2), 808 – 820 (August 2012).

University of Arkansas Press

The University of Arkansas Press reports the following significant items for FY2013.

- Current best-sellers include *John McDonnell* and *Arkansas: A Narrative History, 2nd Edition*. Each has nearly three thousand copies in print. These represent large critical and financial successes by any measure.

The paperback edition of *Medgar Evers*, released in coordination with the 50th anniversary of his assassination, garnered special attention by the NAACP.

The Red Kimono, our second book focusing on the Japanese American Intern Camps in Arkansas, continues to impress, and has recently been awarded “Editor’s Choice” by the Historical Novel Society. In addition, *Camp Nine* has been selected by the Arkansas State Library’s Arkansas Center for the Book as the 2013 “If Every Arkansan Read the Same Book” selection.

- Annual net sales were down 1.8% compared to FY2012. Net sales for all reporting AAUP presses decreased 4.3% over the same period. A weak library market was countered by an increase in sales of digital offerings (e-books). Total operating expenses were down for the fourth consecutive year, and to the lowest level since FY2005, at \$735,844.
- A new distribution agreement was completed with the Fayetteville Public Library. *Up Among the Hills*, a documentary based on the history of Fayetteville, directed by Larry Foley, was the he first entry in the arrangement, and the press’ sixth collaborative effort with Mr. Foley.
- A landmark agreement was completed with Ingram Book Company’s digital division, CoreSource, to distribute digital content for the University of Arkansas Press.
- The UA Press joined forces with Project MUSE to deliver an electronic version of our popular journal, *Philosophical Topics*.
- UA Press secured grants and subsidies to underwrite the publication of several book projects in FY’13. One major project, *The Art of George Dombek*, attracted over \$100,000 in funding. Other project subsidies received in the year totaled over \$43,000.
- UA Press e-book sales earned \$21,000, bringing life-to-date e-book sales total to \$36,000. These early results indicate a large addressable market, and an opportunity for material growth in sales.
- Production process now delivers all titles in multiple formats, including print, pdf, mobi (for the kindle market), and epub (for the e-book market at large).
- UA Press signed over fifty advance contracts--the largest number of commitments in our history.

Arkansas High Performance Computing Center

Use metrics: 24.5M core hours delivered to **159 active users** (398 total users) in **twenty departments** across **four UA colleges and units** (ENGR, ARSC, AGRI, FINN, & VPRS). In addition to intramural clients, the AHPCC also supported research collaborations at six external academic institutions: UALR, UAPB and ASU in Arkansas, the West Virginia University, and two research institutions in Europe and Asia.

AHPCC computing, storage and networking resources support \$28.7M in active extramural research grants and contracts including two major infrastructure grants totaling \$2.6M for machine room renovations and new computing equipment from the National Science Foundation.

Capacity metrics: 4,985 cores across three generations of Intel Xeon CPUs, **73 TFlop/s CPU peak performance**, **13.4TB of system memory**, **117 TB long-term storage**, **374 TB high speed scratch storage**, and **96 TB backup storage**.

AHPCC highlights for FY 2013

Expansion of the Razor supercomputer was started in June 2012 and completed in late July 2012. The upgrade doubled the available computing power and added 112 nodes with eight cores per node for a total of 1,792 new processing cores. The expansion was built on existing Ethernet and InfiniBand networks and uses the existing IBM GPFS high speed parallel file system. This project was funded by NSF MRI grant #0959124, internal funding by the University, and purchases of individual nodes by researchers through the AHPCC “condo computing” program.

In addition to improving computing capacity, the performance of the cluster’s NFS file system was improved by adding a dedicated NFS server and 24 TB of disk.

Also added this fiscal year is a “Science DMZ” node (see <http://fasterdata.es.net/science-dmz/>). This node and associated storage are connected to the ARE-ON regional network and Internet2 at 10 Gbps, allowing researchers to transfer data to and from the HPC complex to other state, national and international research institutions at about ten times the previously available maximum throughput. *Globus Online* (<http://www.globusonline.org>), an optimized high-throughput file transfer service, is available to users at UA-F to implement start-and-forget file transfers to the UA-F Science DMZ node. This new service is made possible by implementation of a campus “research network” discussed in more detail below.

An NSF ARRA ARI award (#0963249) for improvements in machine room power, cooling and campus networking was substantially completed in FY2013. The award end date is August 31, 2013. Improvements through this award include:

- New power entry and battery backup: Approximately 2000 kVA of new battery power are available to run HPC equipment. A new cooling plant for the HPC UPS system was also added.
- Liquid cooling plumbing and rack-mounted heat exchangers: Closed circuit liquid cooling will be provided to all HPC racks as of August 31. This cooling system allows HPC

equipment to be cooling-neutral with respect to existing air conditioners in the machine room. HPC systems will be purchased with rack level cooling to maximize the ARI investment and minimize impact on existing data center cooling equipment.

- Campus research network: Also included in the ARI grant were upgrades to network connections to research-intensive buildings (to 10Gbps), to specific labs and offices with identified needs (to 1 and 10 Gbps), and to the HPC area in the data center (10 Gbps). The network upgrades were implemented as a separate network that only carries research-related traffic. The on-campus research network is connected to the ARE-ON regional network at 10 Gbps, which provides a 10 Gbps end-to-end path to national supercomputer centers and major research institutions.

A core part of the mission of the AHPCC is to provide training in high performance computing for graduate students (and professional development for faculty). In addition to real-time consulting with faculty, staff and students the Center engaged in the following outreach and training activities:

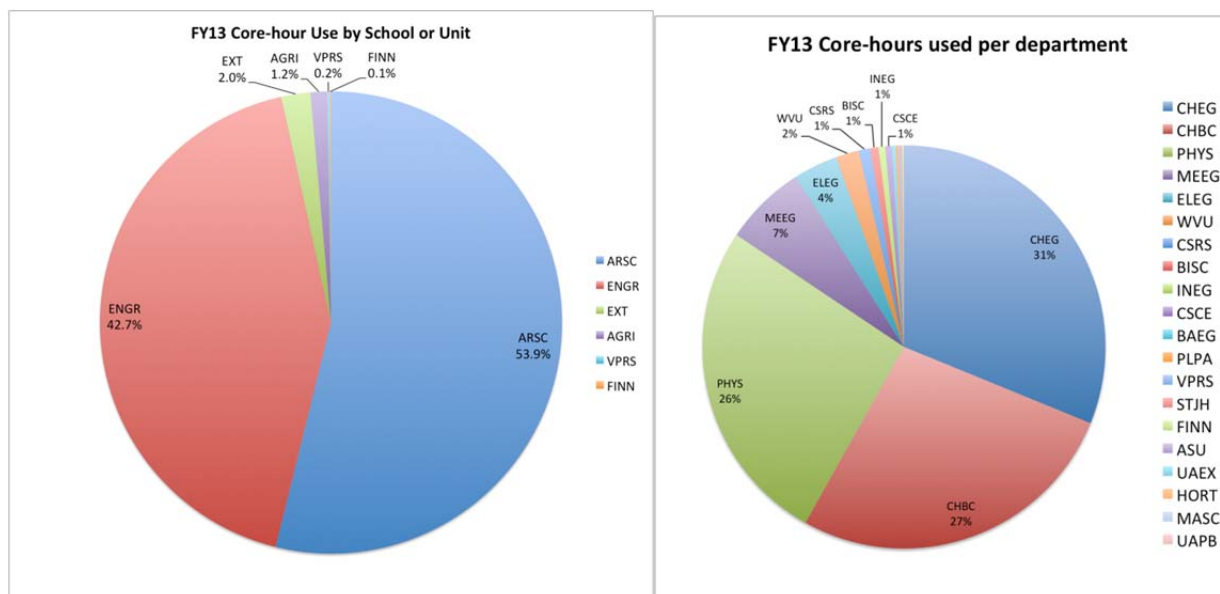
- An open house and poster session to showcase HPC services and research supported by the AHPCC
- Direct support for two graduate classes, CSCE 5013 “Advanced Special Topics in Computer Science or Computer Engineering”, and BIOL 580V “Practical Programming for Biologists”
- Sponsored an eleven week “Supercomputing in Plain English” distance learning class, attended by about 20 UA-F faculty, staff and students
- Provided an overview of supercomputing and research computing to a group of undergraduates participating in an NSF REU summer program (“HIT@UCA: Applied Research In Health Information”, Department Of Computer Science, University Of Central Arkansas, NSF REU #1062838)
- Participated in the CSCE Department’s summer computing camp through talks about scientific computing and building a simple cluster, and touring the HPC part of the data center.

Usage and Research Productivity

As of the end of FY13 there are 398 users with HPC accounts, with the majority being post-docs, graduate students and undergraduate students. Of the total number of accounts 159 of these accounts are in active, regular use.

Usage of AHPCC computing resources by school and department are shown in the charts below.²

² Data used in these charts can be found at <https://uasharepoint.uark.edu/sites/AHPCC/Shared%20Documents/Forms/AllItems.aspx?RootFolder=%2Fsites%2FAHPCC%2FShared%20Documents%2FAnnual%20reports%2FFY13&FolderCTID=0x0120004124BBB8DE656F429F7D657C6406E3B8&View={9697F0FA-12BA-42BC-BE35-D6B5F697F437}>



The majority of the computing resource use was by the College of Arts and Sciences, primarily by clients in Chemistry and Physics. Professor Peter Pulay’s research group in Chemistry is the largest user, followed by Professor Bellaiche’s computational nanoscience group. The College of Engineering is the second largest user, led by Professor Doug Spearot’s and Professor Xianghong Qian’s research groups in Mechanical and Chemical Engineering departments, respectively.

Based on the external benchmark price for Amazon EC2 cloud computing service of \$0.05/core-hour, the AHPCC delivered \$660,631 and \$523,487 worth of EC2-level service to ARSC and ENGR, respectively. Not included in this valuation is the cost for storage and data transfer, which considerably increase the cost of using the Amazon EC2 service.

During FY13 the Center saw a large increase in use by researchers in biology and agriculture. These researchers are engaged in a range of computationally intensive work, with the leading application being assembly of genomes using data acquired from next generation DNA and RNA sequencers. The process of validating input data and assembling genomes is computationally intensive and requires much more memory and storage than our physics and computational chemistry workloads. The AHPCC is responding to the growth in bioinformatics and other life sciences computing research activity at UA by:

- Developing expertise in bioinformatics codes and processing pipelines
- Installing and tuning bioinformatics codes used by UA researchers and students
- Working with life sciences research community to understand their new computing and resource requirements
- Organizing existing large memory nodes to be more useful for bioinformatics computing

The Center actively seeks to support collaborations with other UA campuses and other institutions of higher education in Arkansas. For example, the AHPCC provides expertise, computing and storage resources to the Arkansas Center for Plant Power Production (<http://www.plantpoweredproduction.com>). Other examples of new research projects related to energy and life sciences that the AHPCC supports include: (1) Analysis of genomic data from diverse crop plants, (2) Comparative analysis of microeukaryote genomes and large-scale phylogenomics (3) Ab initio molecular dynamics simulations for the investigation of the mechanisms and energetics for biomass conversion to biofuels, and (4) Biomagnetics and terahertz imaging of human tissues to detect tumors.

The Center submitted a proposal in February 2013 to the NSF for a major research instrumentation grant to further develop our ability to support life sciences and energy research. As of this report awards have not been announced, but if funded this proposal will provide computing and storage to meet the immediate demands presented by the University's commitment to build research capacity in these areas. In addition to pursuing this and other funding opportunities the Center will be working on the following priorities:

- Developing a more sustainable funding scheme for both staffing and hardware
- More computing and storage capacity for AHPCC academic clients
- More outreach to researchers who could be “non-traditional” supercomputer users (e.g. in computational neuroscience, linguistics and textual analysis, and business analytics)
- More education and training events for faculty and graduate students
- Working with UITS to develop a strategic plan for research computing that includes both UITS and VPRED priorities
- Collaboration with a statewide bioinformatics consortium including the U.S. Food and Drug Administration, the Arkansas Governor's office, Arkansas Research Alliance, UALR, UAMS, Arkansas State University and UAF
- Developing a chargeback service to support technical computing by Arkansas businesses and government agencies.