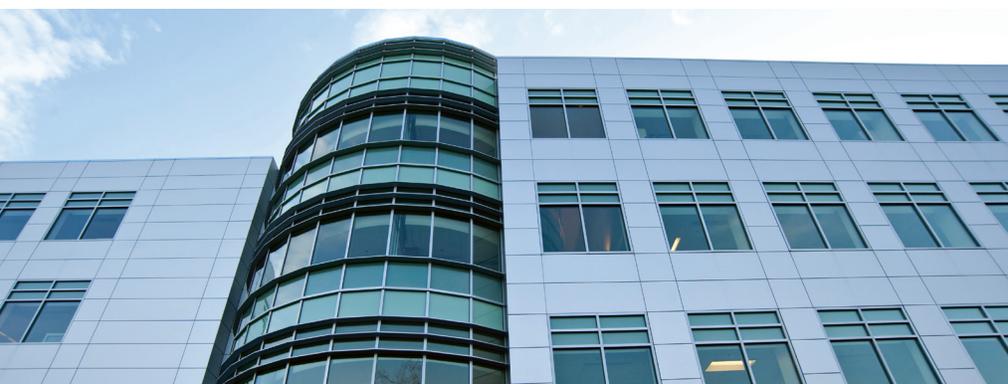
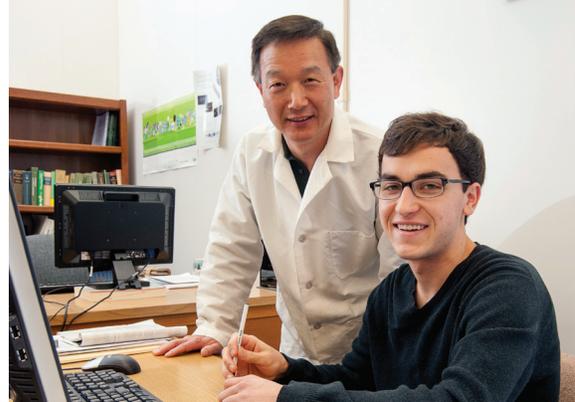


DISCOVERY LEARNING RESEARCH CENTER  
**2012 INNOVATION & IMPACT**



PURDUE UNIVERSITY  
**Discovery Park**



**Society now exists within a knowledge economy that is highly technical and information-rich. Educating students to understand and excel within this system is one of today's greatest and most important challenges. The Discovery Learning Research Center strives to be in the vanguard in understanding and developing interdisciplinary learning and the educational methodologies that support it, and then translating these findings into teaching and learning practice in formal and informal environments at all levels.**



**DLRC OVERVIEW**



## MISSION

### DISCOVERY WITH DELIVERY FOR TEACHING AND LEARNING

The Discovery Learning Research Center works to transform education, especially in science, technology, engineering and mathematics (STEM) and STEM-related disciplines, to increase learning.

## VISION

### NATIONAL INFLUENCE AND INTERNATIONAL IMPACT

The Discovery Learning Research Center will achieve national and international recognition for its:

- innovations in curricular and pedagogical development,
- research on instructional practices, and
- leadership in STEM educational policies and public STEM literacy.

## GOALS

The DLRC is a unique center within Discovery Park, as it bridges the scientific research of each center in the park with the fundamental educational mission of the university. By working at the interface of STEM research and STEM education, the DLRC is strategically positioned to:

- catalyze large-scale, interdisciplinary research programs in teaching and learning, especially in STEM and STEM-related fields;
- promote articulation between the scholarship of teaching and learning and actual classroom practice at all levels; and
- provide leadership in influencing STEM public literacy and educational policy.

## EXPERTISE

The DLRC brings a variety of expertise and experience to collaborative projects, including:

- designing and conducting educational research;
- designing, developing and conducting evaluation of formal and informal educational programs;
- launching, coordinating and supporting projects;
- disseminating research and evaluation results through presentations, manuscripts and other means; and
- developing, delivering and evaluating student and faculty professional development.

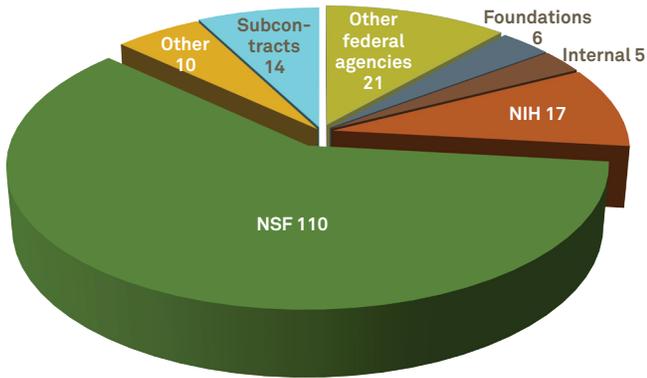


## Proposal Development in the DLRC

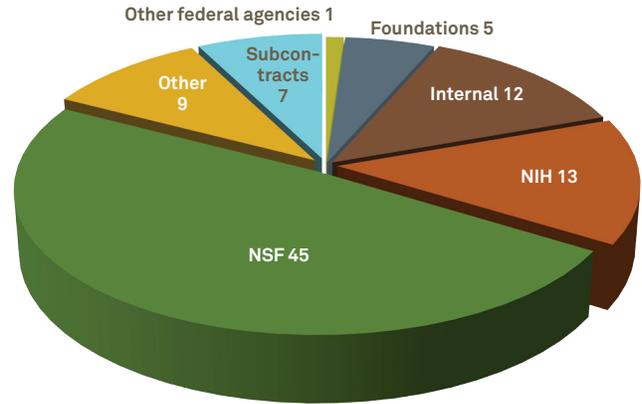


Collaboration with the DLRC adds value to a project from the inception of an idea through the proposal preparation, implementation and dissemination stages. Successful projects often lead to new funded proposals with DLRC partnership.

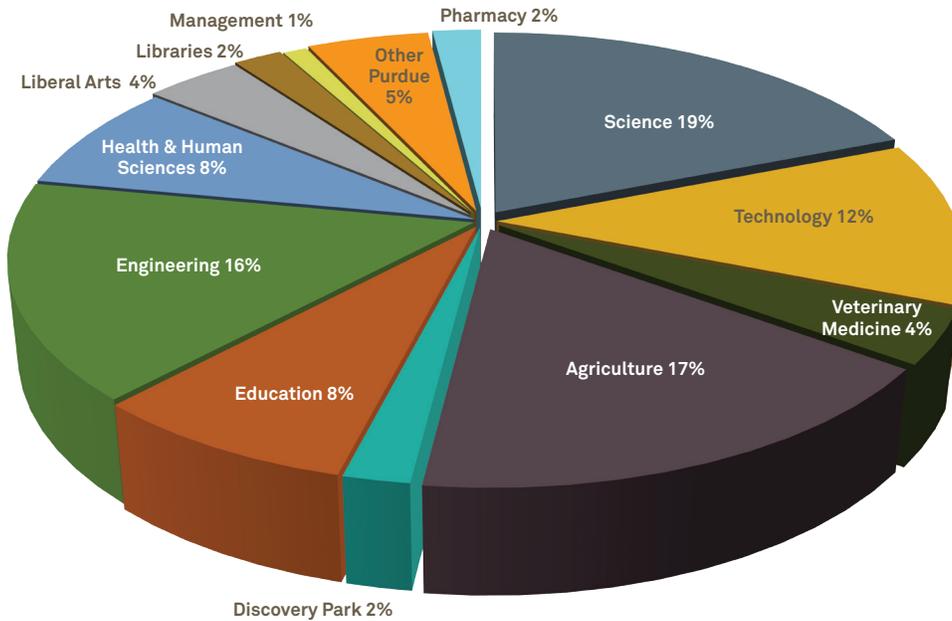
**FY 2008-09 to 2012-13  
DLRC Proposals Submitted by Agency  
(183 total)**



**FY 2008-09 to 2012-13  
DLRC Proposals Awarded by Agency  
(92 total)**



**PIs and Co-PIs College/Center of Origin**



The Discovery Learning Research Center occupies the first two floors of the Hall for Discovery and Learning Research (DLR).



In 2012, the DLRC earned **Integrated Safety Plan (ISP) certification** from Purdue's Department of Radiological & Environmental Management (REM), which monitors compliance with federal, state and university environmental, health and safety regulations. The DLRC laboratory manager can assist researchers and groups using DLRC facilities with hazard assessment and safety training.



**Flexible classrooms and laboratory research spaces** within the center, inspired by the "black box theatre," provide researchers with almost unlimited opportunities to explore and study innovations in educational technologies, pedagogies and learning. Researchers are able to reconfigure rooms, adjust breakout spaces, vary seating arrangements or alter lighting.



# FACILITIES & CAPABILITIES

Open space in the **Project Lab** accommodates learning research that combines presentation, hands on experiences, and technology.

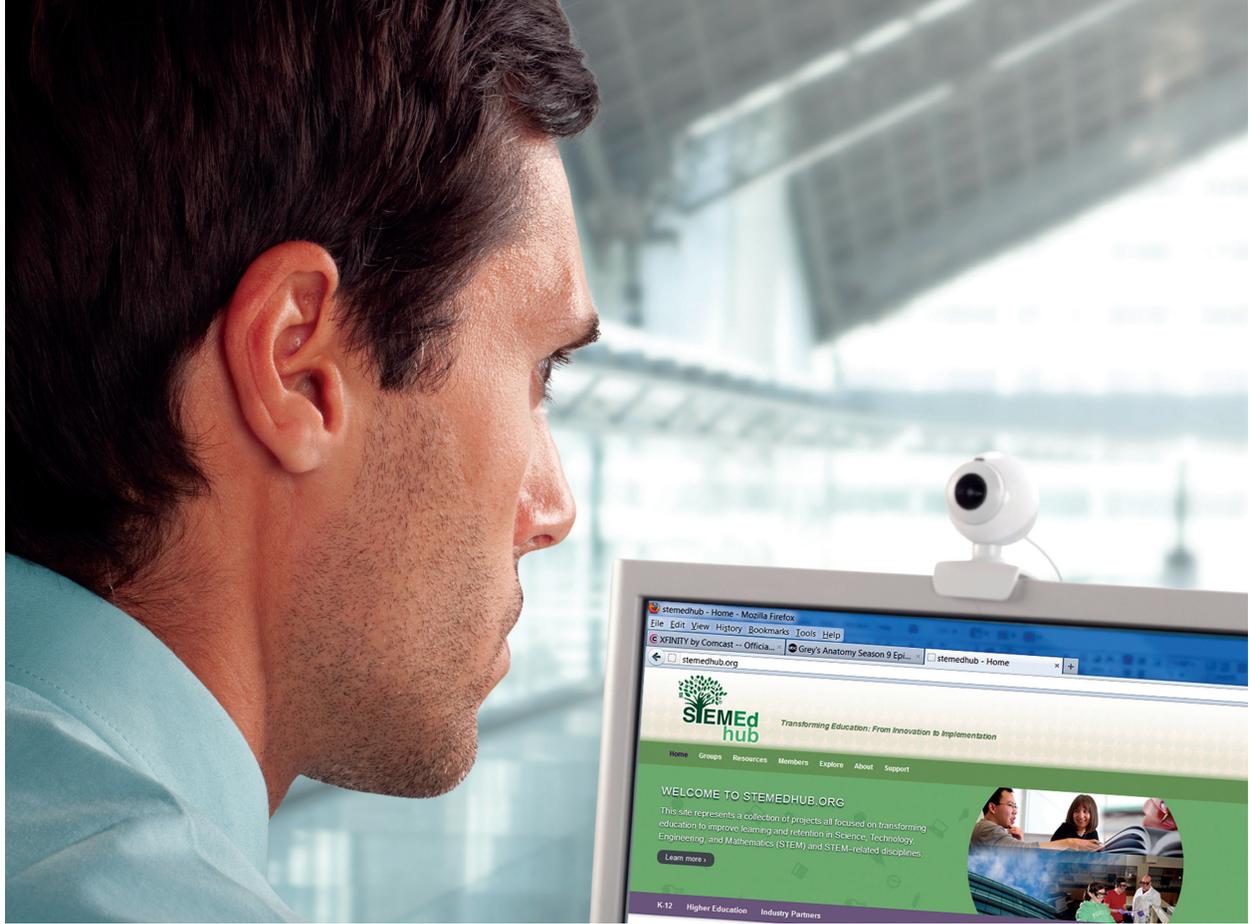


**Multiple cameras and microphones** permit researchers to capture classroom activities for later review, enhancing their teaching practices and contributing to educational research. DLRC project coordinators and the media specialist can help faculty members determine how DLRC resources such as these can enhance their research.



**Pod space** facilitates collaborative work by researchers from all across campus on interdisciplinary projects.





**Educators around the world have innovative ideas for education, and STEM-Ed Hub provides a virtual space for bringing them together. Built on Purdue's HUBzero architecture, the site serves as an online community of practice for university researchers, administrators and K-12 teachers. Users can upload and interact with scientific tools, presentations, wikis and documents, including assessment plans and courses. Through these tools and community forums, participants find inspiration and form new collaborations.**



# ONLINE COMMUNITY OF PRACTICE



## REPORTS

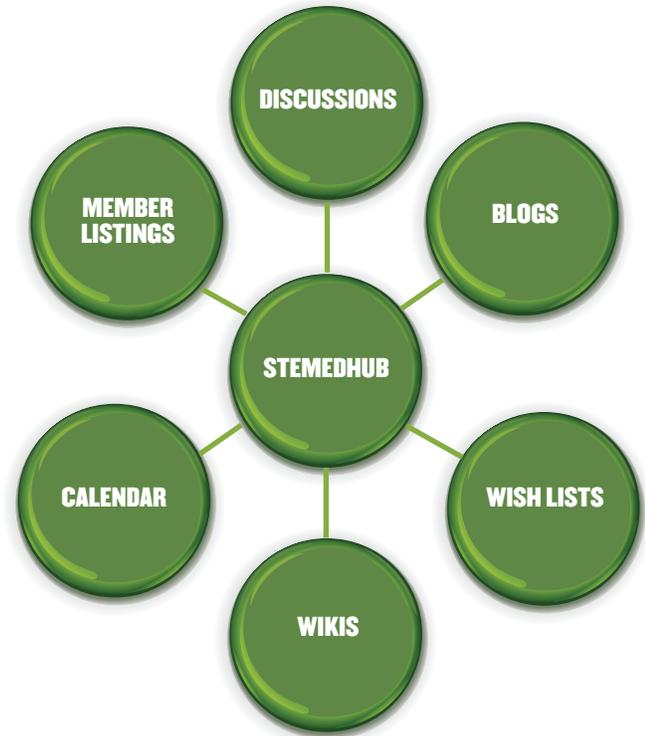
The built-in hub and Google analytics usage reports provide detailed metrics such as number of visitors, numbers of posts, average posts per visitor, amount of time spent, and number of questions per visitor. The site also allows for many levels of security access, which makes it easy to make portions of the information public while keeping others private.

## FUNDING

STEMEdhub.org uses a shared funding model that ensures the continued life of projects past the end of their funding, and enables a quick start without the

large expense of starting and establishing a new hub. All projects on the hub benefit from advances in functionality and infrastructure that are developed for any HUBzero-supported group or hub for little to no work and no added cost. Additionally, STEM-Ed Hub projects become part of an established STEM education community of researchers, teachers and administrators.

Current hub communities include conferences, events and education research projects for all education levels. As more and more communities are developed, they attract membership, share resources and learn from one another.



**480** RESOURCE DOCUMENTS,  
LESSON PLANS, TUTORIALS & VIDEOS

**5,000** UNIQUE VISITORS

**62,952** PAGE VISITS



**At a time when student interest and participation in science is declining, a well-planned field trip captures students' imagination as they see first-hand the relevance and excitement of science. Through zipTrips, Purdue brings real-world scientists to middle schoolers to increase their access to STEM researchers; nurture their knowledge, interest and enthusiasm for STEM fields; and enhance teacher confidence in implementing an electronic field trip in the classroom.**



**BROADER IMPACTS**



## ZIPTRIPS

### Reaching School Audiences at a Distance

Initially funded by a pre-college award from the Howard Hughes Medical Institute to Prof. J. Paul Robinson, zipTrips is a collaboration among Purdue's College of Veterinary Medicine, College of Agriculture, ITaP and the DLRC. Over the past five years, the original project team has developed and tested the efficacy of these electronic field trips for 6th, 7th and 8th graders. Professionally produced, they are visually appealing, fast-paced, and able to reach thousands of students simultaneously — making zipTrips a cost-effective way to link students with scientists.

### KEY FINDINGS

Extensive program analysis reveals that zipTrips aid researchers in meeting broader impact goals. Across grade levels, zipTrips:

- positively influence student perceptions of scientists and science careers;
- increase student awareness of career opportunities in science;

- provide valuable supplemental content online for teachers; and
- allow students to see science and scientists who would otherwise be unavailable to them.

We continue to assess the ability of zipTrips to reach a large and diverse audience and to influence student attitudes, perceptions and learning outcomes in science.

### EXTENDING ZIPTRIPS

Last fall, the zipTrips team partnered with Health and Human Services Extension to produce a spin-off zipTrip, "Science of Nutrition," featuring Purdue scientists researching nutrition, physical activity and environmental concepts affecting children's health.

We also have launched Virtual Field Trips (VFTs) to connect researchers with students and teachers via live webstreaming. These are less formal than zipTrips, allowing researchers to share their enthusiasm and knowledge with students in real time at very little cost. VFTs can be recorded and housed

on STEMEdhub.org and the DLRC Facebook page for future access. In preliminary tests with our Research Goes to School partners, they have been very well received.

**9 LIVE ZIPTRIPS**

**53,000+**

**MIDDLE SCHOOL PARTICIPANTS**

**38+ STATES AND SEVERAL COUNTRIES**

**1,289 CLASSROOMS**

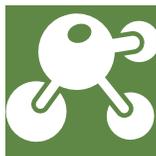
**3 REFEREED JOURNAL ARTICLES**

**27 CONFERENCE PRESENTATIONS**

**5 AWARDS**



**The NSF-funded Science Learning through Engineering Design (SLED) project aims to improve science learning in grades 3-6 by preparing teachers and prospective teachers to use engineering design for inquiry-based learning. Members of the SLED Leadership Team, in collaboration with design team faculty and teacher partners, are researching teachers, students and partnerships while also collaborating with the DLRC to generate partnerships among the Colleges of Education, Engineering, Science and Technology for developing Indiana standards-based tasks.**



# **MODELS FOR SCHOOL & COMMUNITY PARTNERSHIPS**



## SLED

Specifically, SLED team members are investigating three tiers of research:

- how students learn science when engaging in engineering design-based tasks and how they conceptualize and learn design;
- how teachers implement innovative engineering design-based lessons and what differences exist in teacher-identified challenges between rural and non-rural school settings;
- how the partnership fosters a productive community of practice.

Already, faculty design teams have used DLRC project and science teaching laboratory spaces for:

- designing solar panel systems that track the position of the sun,
- developing sensors that use carbon dioxide generated from chemical reactions,
- developing a process to recycle paper, and

- designing a system to shade school lunch tables that account for changes in sun angle and how shadows are affected by the relative position of the earth and sun.

The DLRC's learning studios and the educational design laboratory in the Hall for Discovery and Learning Research also housed the SLED Summer Institute for 38 teachers and 5 pre-service teachers. Participants learned about the engineering design process; engaged in authentic, engineering design-based science tasks taught by the faculty design teams; and developed implementation plans to integrate design activities into their existing curricula.

The SLED team also conducted an elementary science methods course in the science teaching lab, where 38 elementary pre-service teachers conducted experiments, used technology and engaged in design experiences.

## FAT DOGS AND COUGHING HORSES

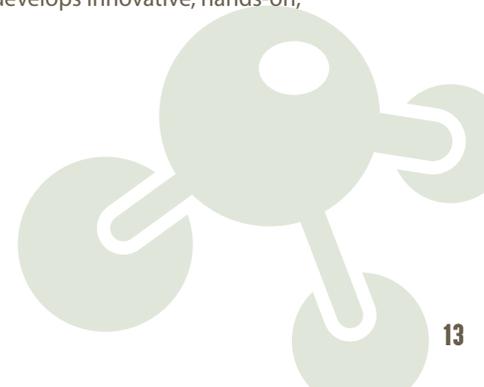
### Animal Contributions to a Healthier Citizenry

The "Fat Dogs and Coughing Horses" project partners Purdue's College of Veterinary Medicine, Exhibit Design Center, College of Education, Discovery Learning Research Center and Extension with Indiana K-12 schools. Led by Dr. Sandra SanMiguel, associate dean for engagement, Purdue University College of Veterinary Medicine, the project aims to:

- enhance K-12 health science education,
- increase the number of students interested in pursuing careers in health science research, and
- improve public health literacy.

To accomplish these aims, the project:

- develops innovative, hands-on,





problem-based learning resources for teachers and parents,

- provides professional development for K-12 teachers,
- connects students with health scientists as role models,
- engages the public in health and fitness activities, and
- develops interactive exhibits that communicate key concepts in health science.

The “Fat Dogs” project is a novel model for the development and management of engaging partnerships among K-12 schools, community science centers, museums and university faculty. The DLRC is working to develop and evaluate this engagement model so that it can be applied in other contexts. Preliminary project results show that interactions with animal scientists are effective at increasing students’ interest in science careers even for very young

elementary school students.

## RESEARCH GOES TO SCHOOL

Rural schools often struggle to retain STEM teachers because of the challenges of teaching multiple subjects at multiple ability levels and the lack of mentoring and collaboration opportunities.

As part of the National Science Foundation-funded Research Goes to School project, DLRC has been investigating what factors might prompt rural STEM teachers to stay.

Using qualitative data from a focus group session with six rural in-service STEM teachers, the study, published in the 2012 spring/summer issue of the *Rural Educator*, revealed three broad factors related to persistence:

- strong interpersonal relationships and community ties in rural communities,
- school factors, and

- professional factors.

Respondents viewed each of these factors as double-edged, providing elements that both enhance retention and contribute to their attrition. In fact, they reported that one of the challenges of rural STEM teaching — teaching multiple subjects for different student ability levels — actually contributes to intellectual stimulation. The respondents also noted that they can connect science topics with rural life.

Although limited by a small sample size, the findings have implications for rural schools and STEM teacher educators. The authors recommended that schools offer teachers more preparation time to help compensate for the lack of mentoring opportunities and the challenges of teaching multiple subjects and grade levels. They also encouraged teacher educators to explicitly train pre-service and in-service teachers to



capitalize on the benefits and manage the challenges of teaching in rural communities.

Finally, the authors noted that rural schools may need to offer networking opportunities to promote collaborations not available within each school. Ultimately, preparing creative, innovative STEM teachers to implement relevant, experiential curricula in rural classrooms could have a tremendous impact on the educational attainment and STEM aspirations of the nation's rural youth.

## **INSTITUTE FOR ACCESSIBLE SCIENCE**

### **Broadening Participation in Research**

Students who dream of studying science but face hurdles because of physical impairments are finding new options, thanks to Purdue's Institute for Accessible Science (IAS). Established through a \$2 million

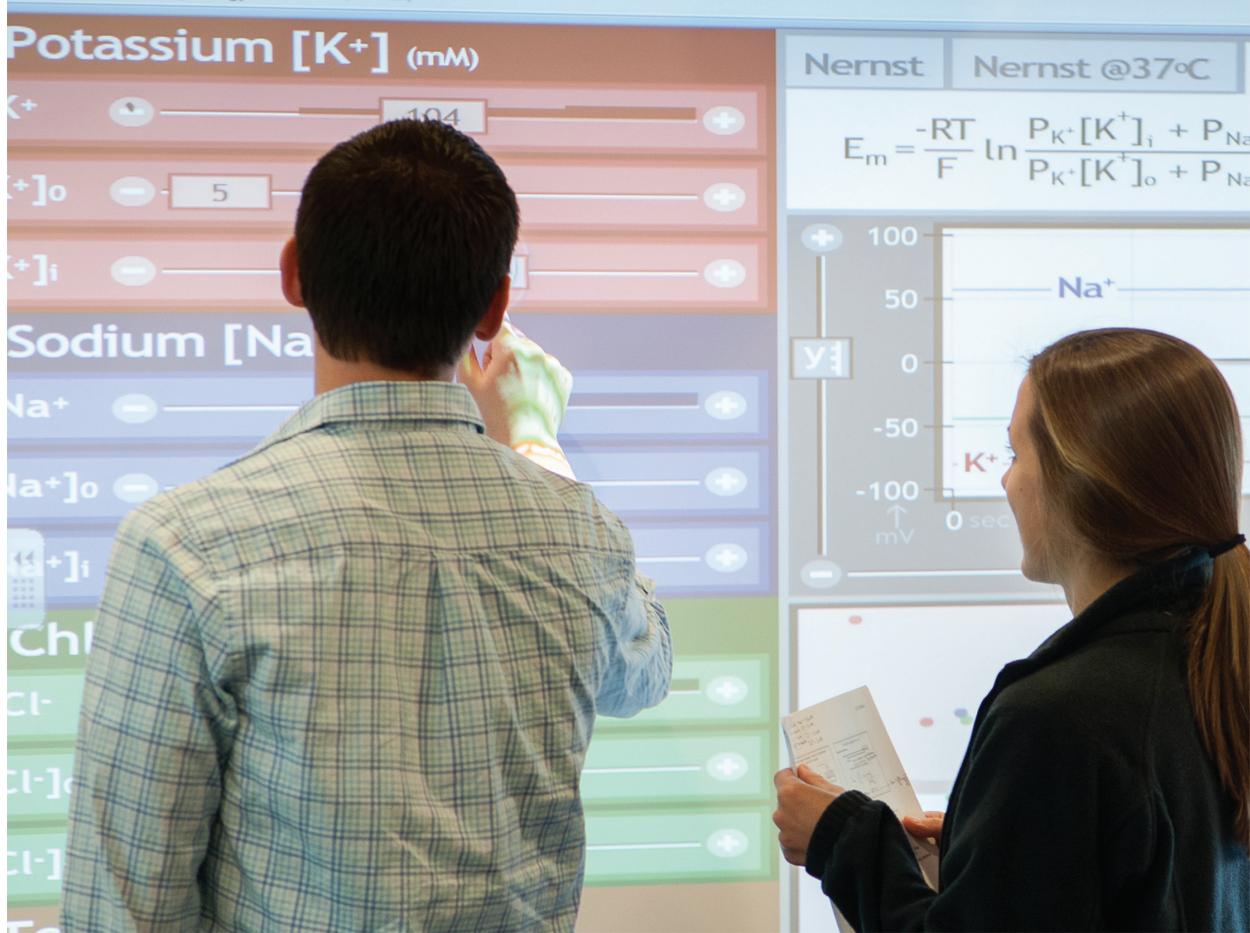
NIH Director's Pathfinder Award, the IAS promotes the inclusion and retention of persons with disabilities in biomedical science careers.

IASHub, for instance, fosters a community in which people with disabilities and other stakeholders can locate and share information about college accessibility, science curricula, career choices and disability-related concerns. Powered by HUBzero technology, the hub also supports all IAS activities, including a research internship program, innovative science-specific AT interventions, lab practice simulations, remote scientific instrumentation, and online workshops and webinars. Other innovations include:

- The Accessible Biomedical Immersive Laboratory (ABIL), which develops innovative and customized science laboratory instruments, enhancements and strategies and provides learning

and research opportunities for people with disabilities;

- IAS-developed Robotics and Gesture Recognition Software, which helps persons with limited upper extremity motor function perform common lab techniques, and helps people more naturally and effectively control robotic devices, laboratory assistive technology and virtual reality environments; and
- IAS Summer Research Fellowships, which decrease barriers for secondary students interested in pursuing research careers in biomedical science. Last summer, the fellowship supported a disabled student participating in a residential research internship on Purdue's West Lafayette campus. The summer experience improved the student's research skills, career awareness, and confidence while also decreasing negative stereotypes about disabilities among participants.



**Foundational courses at Purdue ensure that all students develop fundamental knowledge and a broad set of skills for successful employment, responsible citizenship and continuous learning. But traditional lecture halls with 100-plus students may not be the optimal environment for teaching these fundamentals. Through a new project, Instruction Matters: Purdue Academic Course Transformation (IMPACT), faculty and staff members are redesigning key introductory classes, creating more student-center environments for improved competency and confidence.**



# NEW DIRECTIONS IN UNIVERSITY TEACHING



## INSTRUCTION MATTERS

### Purdue Academic Course Transformation

Spearheaded by the Provost's Office, IMPACT team members are using research findings on sound student-centered teaching and learning to enable faculty-led course redesign based on student-centered pedagogy. DLRC Director Gabriela Weaver and assessment specialists Loran Parker and Lola Adedokun are part of the team assessing the results of IMPACT on student success, faculty self-efficacy and practice, and classroom practice.

Several faculty are taking advantage of the flexibility and available technologies in the DLRC to pilot innovative classroom practice for the Spring 2013 semester.

### John R. Burgess and Jennifer Kruse (Nutrition Science)

The DLRC's Learning Lab, rooms 131, 143 and the atrium are being used this semester as part of a transformation of NUTR 30300, an introductory nutrition course for non-majors. The course

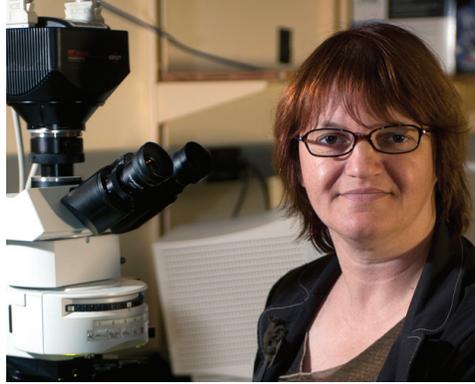
normally meets three days a week for lecture in a classroom that often is at capacity in terms of enrollment. This semester, more than 400 students are being assigned to groups and meeting in the DLRC space for five weeks.

Group projects are allowing them to put into practice theoretical information learned during face-to-face and online lectures. Reading and debugging food labels, choosing a healthy meal when eating out, critically evaluating supplements and identifying food safety problems are among the skills being practiced. The smaller settings are giving the professors more direct contact with students than they would have in a larger environment.



### Stephanie Gardner (Biological Sciences)

This spring, Prof. Stephanie Gardner is using the DLRC Large Learning Studio (room 131) to facilitate learning through group work and with technology in BIOL 32800 (Principles of Physiology). Physiology is a topic that is best learned by working and struggling with it. The learning studio has already changed classroom dynamics by providing circular pod arrangements that naturally lend themselves to communication. Seven Smart Boards allow students to brainstorm ideas and run simulations that all pod members and instructors can see.



## FACULTY RESEARCH FELLOWS PROGRAM

The DLRC Faculty Research Fellows program seeks to engage the campus in the core mission of the DLRC. For the 2012-2013 academic year, we welcomed three faculty fellows, one through the DLRC faculty research fellow program, and two through the complementary Discovery Park Faculty Research Fellows and Scholars initiative.

### Sophie Lelièvre

Dr. Sophie Lelièvre, associate professor of cancer pharmacology, is the recipient of the 2012 DLRC Faculty Fellow Research Award. She has been working on two projects aimed at developing training on primary prevention research of chronic diseases:

- the development of a distance learning course entitled “International Breast Cancer Prevention” and

- the development of an international training program that includes several countries around the world.

The goal of the course is to provide skills for leadership roles in primary prevention of chronic diseases by:

- developing an understanding of what is primary prevention and how research on this topic should be conducted;
- training the participants to employ strategies to make people from different disciplines conceive and run a research project together;
- examining the impact of diversity in disease prevention research and evaluating primary prevention plans of chronic diseases based on content, disciplines involved and national and international impact; and
- teaching trainees to develop an organized

framework indispensable to support international research via written and oral communications, cooperation and the maintenance of a global perspective.

Lelièvre is currently seeking funding for an international training program to foster the development of individuals well versed in the concept of gene-environment interaction that inherently includes diversity as a central theme. Prevention research of breast cancer will serve as a training model for other chronic diseases.

### Sorin Matei

Sorin Matei, associate professor of communication, has joined the DLRC as a Discovery Park Fellow. His project, “Mining Social Media for Actionable Knowledge to Build the Next Generation of Informal Learning Tools,” examines information garnered from social media with the goal of applying this knowledge to the development of new learning and



knowledge management tools. Some of the research questions that he will explore as a Discovery Park fellow include:

- How do spontaneous groups and leadership positions emerge in social media, especially Wikipedia?
- How do these groups produce usable knowledge?
- How do they foster informal learning?
- How can the answers to these questions be turned into practical advice for building the next generation of learning and knowledge management tools?

Matei is working with the Cyber Center advanced computing infrastructure and the Discovery Learning Research Center to mine a dataset that includes editorial interactions between 3 million individuals over ten years, for a total of 250 million data points. The results

will generate measures and tools that will enhance two existing scholarly collaboration and learning platforms, CRIS and Visible Effort (<http://veffort.us>), which have the potential to shape an emerging informal learning platform, RIPPLE, for K-12 STEM education.

### **Richard Johnson-Sheehan**

Richard Johnson-Sheehan, professor of English, also has joined the DLRC as a Discovery Park Fellow. His project, "Building a Curriculum in Medical, Scientific, and Environmental Leadership," will focus on developing a curricular basis for interdisciplinary studies in medical, scientific and technical fields.

Johnson-Sheehan, who is working with the Oncological Sciences Center and the DLRC, researches the many connections among science, technology, environment, and communications. He has authored books on scientific and technical

communication, composition, and proposals and grants. He is also one of the founding faculty members of the Cancer, Culture, and Community program, which is a collaboration between the Discovery Park's Oncological Sciences Center and the College of Liberal Arts.

Through the project, Johnson-Sheehan will develop a curricular basis for interdisciplinary studies that use leadership and communications as core concepts to help develop tomorrow's innovators in science, medicine and environmental studies. The interdisciplinary curriculum will ultimately connect Discovery Park with the College of Liberal Arts, College of Science, College of Health and Human Sciences, and the Krannert School of Management.





**To help meet increasing demand for skilled STEM workers and researchers, the DLRC oversees three internship programs that create pathways between undergraduate STEM majors, faculty members and local industries. Through our research on program models, we are investigating processes that influence outcomes, examining relationships among intrinsic factors and program outcomes, and identifying best practices for timing and length of undergraduate experiential learning programs.**



**INTERNSHIPS**



## INTERNS FOR INDIANA (IFI)

Interns for Indiana is an entrepreneurial program that enhances student learning and skill development while fueling the growth of high-tech startup companies and stimulating development of high-paying jobs for Purdue graduates.

A qualitative study based on IfI data (Industry & Higher Education, October 2012) examines the process of student learning in an entrepreneurial experiential internship program. Findings indicate that internships allow students to

- acquire knowledge from experts in the field,
- situate their learning in the environment of practice, and
- learn valuable professional and entrepreneurial skills not found in traditional classroom settings.

Students also reported increases in self-efficacy and solidified or enhanced interest in working in a small business. These findings have important implications for researchers, small business owners and entrepreneurial and small business support.

## DISCOVERY PARK UNDERGRADUATE RESEARCH INTERNSHIPS (DURI)

Through Discovery Park Undergraduate Research Internships (DURI), Purdue undergraduates work with Discovery Park on interdisciplinary research projects. A recent study published in the *Journal of College Science Teaching* (Adedokun et al., 2012) examined the relationships among three outcomes of undergraduate research experiences (UREs) — research skills, research self-efficacy beliefs and aspirations for research careers. Key findings of the study were:

- mastery of research skills positively influenced student research self-efficacy beliefs, which in turn predicts career aspirations;
- research skills and research self-efficacy beliefs are important predictors of participant aspirations for research careers; and
- the predictive effect of research skills on aspirations is partially through the mediating influences of research self-efficacy.

## OUTCOMES

**INCREASED  
SELF-CONFIDENCE**

**CLARIFIED  
CAREER GOALS**

**SENSE OF  
ACCOMPLISHMENT**

**MEANINGFUL  
CONTRIBUTIONS**

**IMPROVED  
TECHNICAL AND PROFESSIONAL SKILLS**



The study provides a possible explanation of the relationships among URE outcomes—an area of research that has received very little attention, and serves as a springboard on which more elaborate models (that include other important outcomes) can be built.

## CANCER PREVENTION INTERNSHIP PROGRAM (CPIP)

The Cancer Prevention Research Internship Program (CPIP) is designed to attract bright young scientists into the field of cancer prevention. Working in interdisciplinary teams, interns are introduced to a curriculum specific to cancer prevention through both research and educational opportunities.

Research results suggest that CPIP participants:

- gain awareness of research career opportunities and possible career paths in cancer prevention, and
- gain enhanced motivation to pursue careers in cancer prevention.

Additionally, in partnership with the DLRC, the CPIP program is developing an innovative tool for the assessment of interdisciplinary thinking. Observing and measuring interdisciplinary thinking in students and professionals is a challenge to both researchers and practitioners alike.

As part of the CPIP program, the DLRC is working toward a new tool that allows researchers or educators to assess interdisciplinary thinking (Parker et al., 2012). The CPIP program serves as a test bed for the development and validation of this tool. To date, results from this tool

indicate that students gain a broader understanding of the diversity of disciplines involved in cancer prevention research and are more able to understand how their research impacts society after participating in CPIP.



## MAJOR PROPOSALS AND CONTINUATIONS

PI	Dates	Grant Sponsor Name	Title
Adamo-Villani, Nicoletta	2010-13	National Science Foundation	Building a Serious Game to Teach Secure Coding in Introductory Programming
Bryan, Lynn A.	2009-13	National Science Foundation	Purdue Robert Noyce Scholars: Excellence in Preparation of Rural High School STEM Teachers
Clase, Kari L.	2009-11	The Scripps Research Institute	Constructing an Immersive and Interactive Virtual Experience for Biology Students: Linking Second-Life and the Gene-to-Protein Viewer
Cosier, Richard A.	2012-13	Burton D. Morgan Foundation	Interns for Entrepreneurship
Dib, Hazar	2012-13	National Science Foundation	Collaborative Research: An Interactive Steel Connection Teaching Tool — A Virtual Structure
Dib, Hazar	2012-14	National Science Foundation	VELS: an interactive Virtual Environment for Learning Surveying Concepts and Practices
Dietz, James Eric	2010-13	Ivy Tech State College	Crossroads Smart Grid Workforce Development Program
Duerstock, Bradley S.	2010-13	PHS NIH National Institute of General Medical Science	Institute for Accessible Science (IAS): Advancing Inclusion of Persons with Disabilities in Biomedical Laboratory Research
Dunsmore, Hubert E.	2010-13	National Science Foundation	Adding an Intelligent Tutoring System to Alice
Gentry, Marcia L.	2009-12	U.S. Department of Education	Developing Talents and Improving Student Achievement Among Traditionally Underrepresented Populations
Gibson, Kevin D.	2011-14	Alfred P. Sloan Foundation	Continued Partnership between Purdue University and the Sloan Foundation to Increase the Number of Native Americans Completing Graduate Degrees in the STEM Disciplines
Gibson, Kevin D.	2010-13	Alfred P. Sloan Foundation	Tecumseh Project: Purdue Program for Native Americans — A Proposal for a Partnership between Purdue University and the Sloan Foundation
Lechtenberg, Victor	2008-13	Lilly Endowment Inc.	Supporting and Enhancing Interns for Indiana: A Sustaining Grant Proposal for the Lilly Endowment Purdue University
Minchella, Dennis J.	2011-14	Howard Hughes Medical Institute	A Challenge in Life Sciences Undergraduate Education
Minchella, Dennis J.	2010-13	National Science Foundation	An Adaptation of a Research-Based Laboratory Model to Life Sciences
Minchella, Dennis J.	2010-14	Howard Hughes Medical Institute	Deviating from the Standard: Integrating Statistical Analysis and Experimental Design into Life Science Education
Niyogi, Devdutta S.	2010-12	University Of California — Berkeley	Communicating Ocean Sciences Informal Education Network: Scientists and Educators Working Together to Promote Ocean Literacy
Pai, Vijay S.	2007-12	National Science Foundation	CPATH EAE: Extending a Bottom-Up Education Model to Support Concurrency from the First Year
Panitch, Alyssa	2010-15	National Science Foundation	Science Learning through Engineering Design (SLED) Targeted Partnership
Patterson, John A.	2007-13	National Science Foundation	Partnership for Recruiting and Retaining High Need, High Potential Students to Food, Environmental, Engineering and Life Sciences (FEELS)
Pujol, Santiago	2011-13	Consortium of Universities for Research in Earthquake Engineering	Ground Motion and Building Performance Data from the 2010 Chile Earthquake
Ramirez, Julio Alfonso	2012-13	National Science Foundation	Development of a Web-based Poster Display and Archival Tool
Ramirez, Julio Alfonso	2009-14	National Science Foundation	NEES Operations: FY 2010-FY2014
Ratliff, Timothy L.	2009-13	PHS NIH National Center for Research Resources	Fat Dogs and Coughing Horses: Animal Contributions towards a Healthier Citizenry
Rebar, Alan H.	2008-11	Burton D. Morgan Foundation	Interns for Entrepreneurship Program and Life Sciences Business Plan Competition
Robinson, Joseph Paul	2007-13	Howard Hughes Medical Institute	Electronic Field Trips in Comparative Biology

Roychoudhury, Anita	2008-13	National Science Foundation	Making Sense of Global Warming: Model of Student Learning Via Collaborative Research
Sands, Timothy D.	2010-15	National Science Foundation	A Sustainable Energy Concepts Professional Development Model for Rural Schools & its Extension to a Systemic Approach for Integrating STEM Research & Education
Sands, Timothy D.	2007-13	National Science Foundation	Louis Stokes Alliance for Minority Participation Indiana — Phase II
Sands, Timothy D.	2008-13	National Science Foundation	Purdue Center for Faculty Success
Smith, M.J.T.	2004-13	National Science Foundation	Midwest Crossroads Alliance for Graduate Education and the Professoriate (AGEP)
Streveler, Ruth A.	2008-13	National Science Foundation	Collaborative Research: Expanding and Sustaining Research Capacity in Engineering and Technology Education: Building on successful programs for Faculty and Graduate Students
Teegarden, Dorothy	2008-13	PHS NIH National Cancer Institute	Interdisciplinary Cancer Prevention Research Internship Program
Zurn-Birkhimer, Suzanne	2006-11	National Science Foundation	Mentoring Native American Students for Success in Geoscience Graduate Programs

## 2012 PUBLICATIONS AND PRESENTATIONS

### Peer-reviewed Publications

- Adedokun, O. A. & Burgess, W. D. (2012). Analysis of paired dichotomous data: A gentle introduction to the McNemar Test in SPSS. *Journal of Multidisciplinary Evaluation*, Vol. 8 (17), 57-60.
- Adedokun, O. A., Zhang, D., Parker, L.C., Bessenbacher, A., Childress, A & Burgess, W. D. (2012). Understanding how undergraduate research experiences influence student aspirations for research careers and graduate education. *Journal of College Science Teaching*, Vol. 42 (1), 82-90.
- Adedokun, O. A., Hetzel, K., Parker, L. C., Loizzo, J. L., Burgess, W. D. & J. P. Robinson. (2012). Connecting students with university scientists: Core elements and evaluation of Purdue zipTrips. *Journal of Science Education and Technology*, Volume 21, Issue 5, pp. 607-618. <http://link.springer.com/article/10.1007%2Fs10956-011-9350-z>
- Capobianco, Brenda M. (2012). Investigating essential features for successful implementation of an elementary science methods course on engineering design (Paper # 10058). 2012 Proceedings of Association for Science Teacher Education, Jan.. 4-7, 2012, Clearwater, FL.
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- Adedokun, O. A., Bessenbacher, A., Parker, L.C., Childress, A., Kirkham, L., Teegarden, D., & Burgess, W.D. (2012). How do summer undergraduate research experiences compare to other models? Paper presented at the 2012 Annual Meeting of the National Association of Research in Science Teaching.
- Adedokun, O. A., Bessenbacher, A., Parker, L.C., Childress, A., Teegarden, D., & Burgess, W. D. (2012). Undergraduate research experiences: Modeling relationships among program outcomes. Paper presented at the 2012 Annual Meeting of the American Educational Research Association.
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- Goodpaster, K. P. S., Adedokun, O. A., Kirkham, L. P., Ertmer, P. A., Clase, K. L., McCann, M., & Weaver, G. C. (2012). The impact of a professional development workshop on rural STEM teachers' self-efficacy and biofuels knowledge. Paper presented at the 2012 Annual Meeting of the National Association of Research in Science Teaching.
- Parker, L.C., Varghese, M., Adedokun, O.A., Burgess, W.D., Shively, M.M., & Bessenbacher, A.M. (2012). Entrepreneurial Internship Experiences: Changes in Perceptions and Interest in Small Businesses and Entrepreneurship. Paper presented at the 2012 Annual Meeting of the American Educational Research Association.
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- Parker, L. C., Szteinberg, G., Adedokun, O., Burgess, W., Bricker, J., & Amass, S. (2012). Using a simplified visitor engagement framework to evaluate a traveling exhibit. Paper presented at the American Evaluation Association.

## Other Presentations

- Bessenbacher, A, Burgess, W., & Weaver, G. (2012). Creating and fostering an online community of practice through STEMEdhub.org. Presentation for the National Science Teachers Association Annual Conference, Indianapolis, Ind.
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- Goodpaster, K., Adedokun, O. A., Burgess, W., Kirkham, L., Laursen, S., & Weaver, G. (2012). Teaching science in rural schools: Benefits, challenges, and factors influencing teacher retention. Paper presented at the National Science Teachers Association Annual Conference.
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- Pilarz, M., Pritchard, R., & Weaver, G. C. (2012). Implementation of a research-based lab module in a high school chemistry class: Examining student-student and student-teacher interactions. 244th ACS National Meeting, Philadelphia, PA.
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- Szteinberg, G. A., & Weaver, G. C. (2012). Prediction of student retention in STEM by participation in chemistry course-embedded research experiences. 243rd ACS National Meeting, San Diego, CA.
- Weaver, C.G. (2012). Engaging First and Second Year Science Students in a Course-Embedded Authentic Research Project; Keynote Presentation at the Enhancing Learning in Science through Inquiry and Technology; Sydney, Australia.
- Weaver, G. C. (2012). Defining Learning Outcomes for a Chemistry Degree: The Story of a Process; Plenary Presentation at the Australian Conference on Science and Mathematics Education; Sydney, Australia.
- Weaver, G. C., Molinaro, M., & Hunt, L. (2012). Developing Broader Impacts Statements for NSF Proposals; The Reinvention Center, National Conference, Washington, DC.
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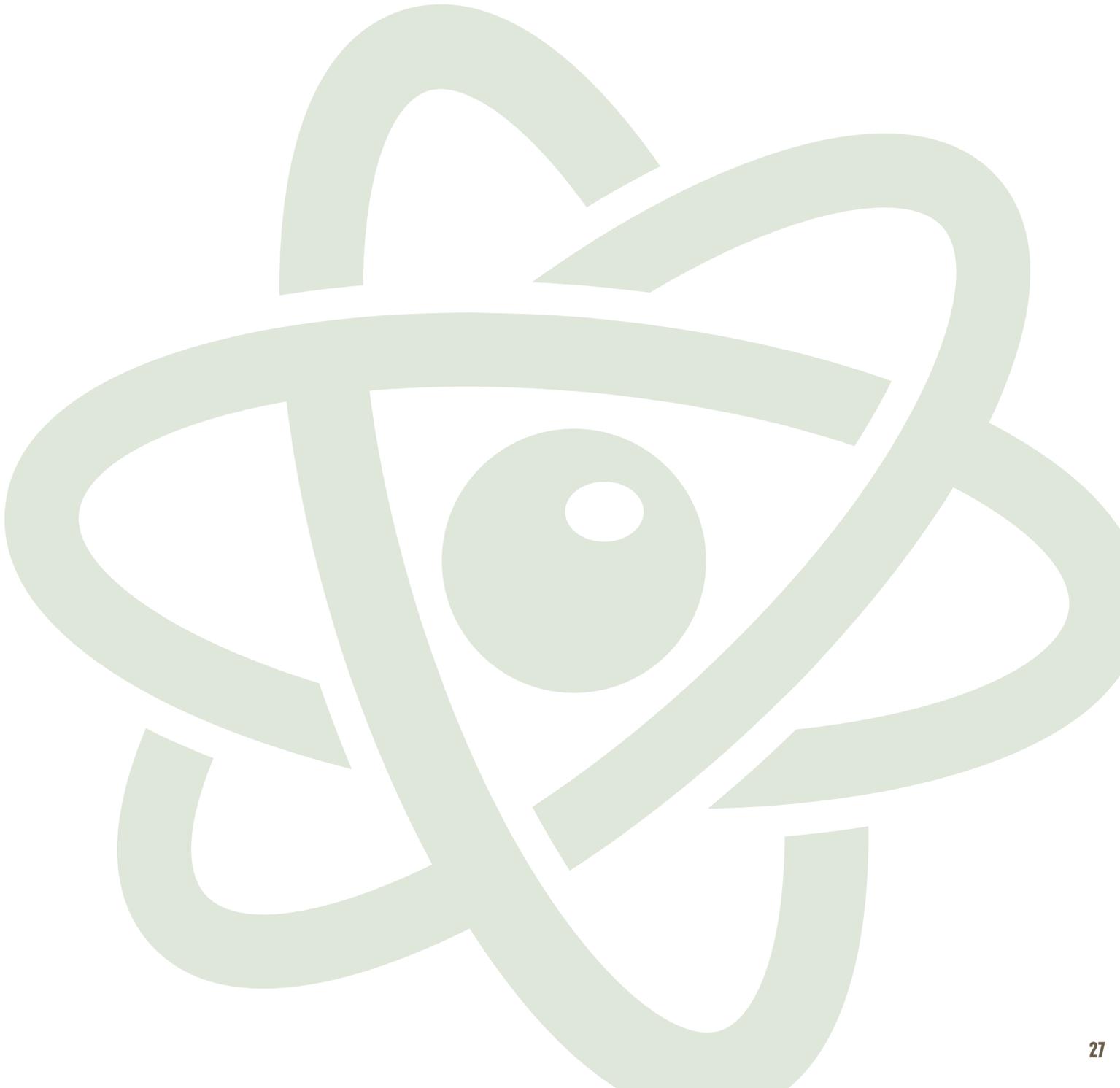
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