



**ILLINOIS SCIENCE &
TECHNOLOGY INSTITUTE**



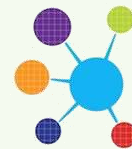
**Summer 2015
Overview**



About ISTI

MISSION

The Illinois Science & Technology Institute (ISTI) is a tax-exempt 501(c) (3) public charity and an affiliated complementary effort to the Illinois Science & Technology Coalition. The ISTI was established to enhance opportunities for philanthropic public-private partnerships, engage in grant-making, and develop and deliver educational programming.



ISEIF



HISTORY

In 2011, the Illinois Science & Technology Institute (ISTI) was formed as a non-profit entity by the Illinois Science & Technology Coalition (ISTC) to strengthen the Illinois talent pipeline for research and development careers. In 2012, ISTI was selected to lead the R&D STEM Learning Exchange.

R&D STEM Learning Exchange

R&D STEM LEARNING EXCHANGE

RDLE and its partner organizations collaborate to develop, test and refine high-quality R&D STEM education resources that promote inquiry-based learning, build critical thinking skills and provide perspective on R&D applications within Illinois industry.



NEXT GENERATION SCIENCE STANDARDS

The RDLE mission and tools are consistent with the goals of the Next Generation Science Standards (NGSS) – adopted in Illinois and taking effect in the 2016-17 school year. NGSS provides a new vision for K-12 science and engineering education focusing on process skills, fostering students' abilities to develop and test ideas and evaluate scientific evidence



Why R&D?

BY 2018, ILLINOIS WILL DEMAND **319,820** STEM JOBS



ILLINOIS has

**\$15.5
Billion**

in R&D investment through
businesses, universities, and federal
labs

Student Research

When students DO science, they take ownership of their learning and practice transfer of that learning as they solve problems that they find relevant.

Students who have an opportunity to participate in original research in high school are significantly more likely to enter and maintain a career in science.

A National Science Foundation report assessed the value of undergraduate STEM research experiences as a positive predictor of continued career participation in STEM fields.

Students can highlight student research experience on college applications and when applying for internships to enhance credentials.

RDLE Partners 2014-15

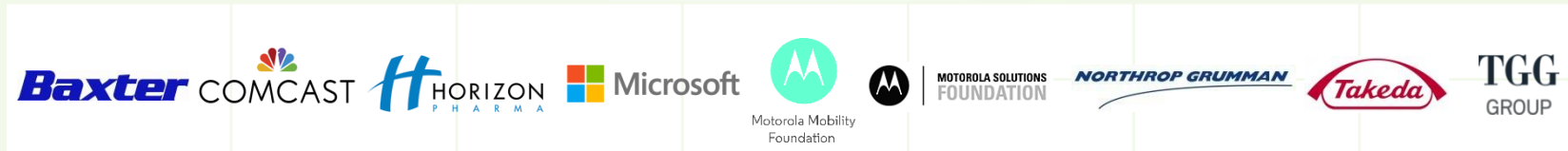
HIGH SCHOOLS



POST-SECONDARY EDUCATION INSTITUTIONS



INDUSTRY PARTNERS



NONPROFITS & GOVERNMENT AGENCIES



2014-15 RDLE Partner Teachers

24% Biology

15% Physics

17% Chemistry

5% Research/Inquiry

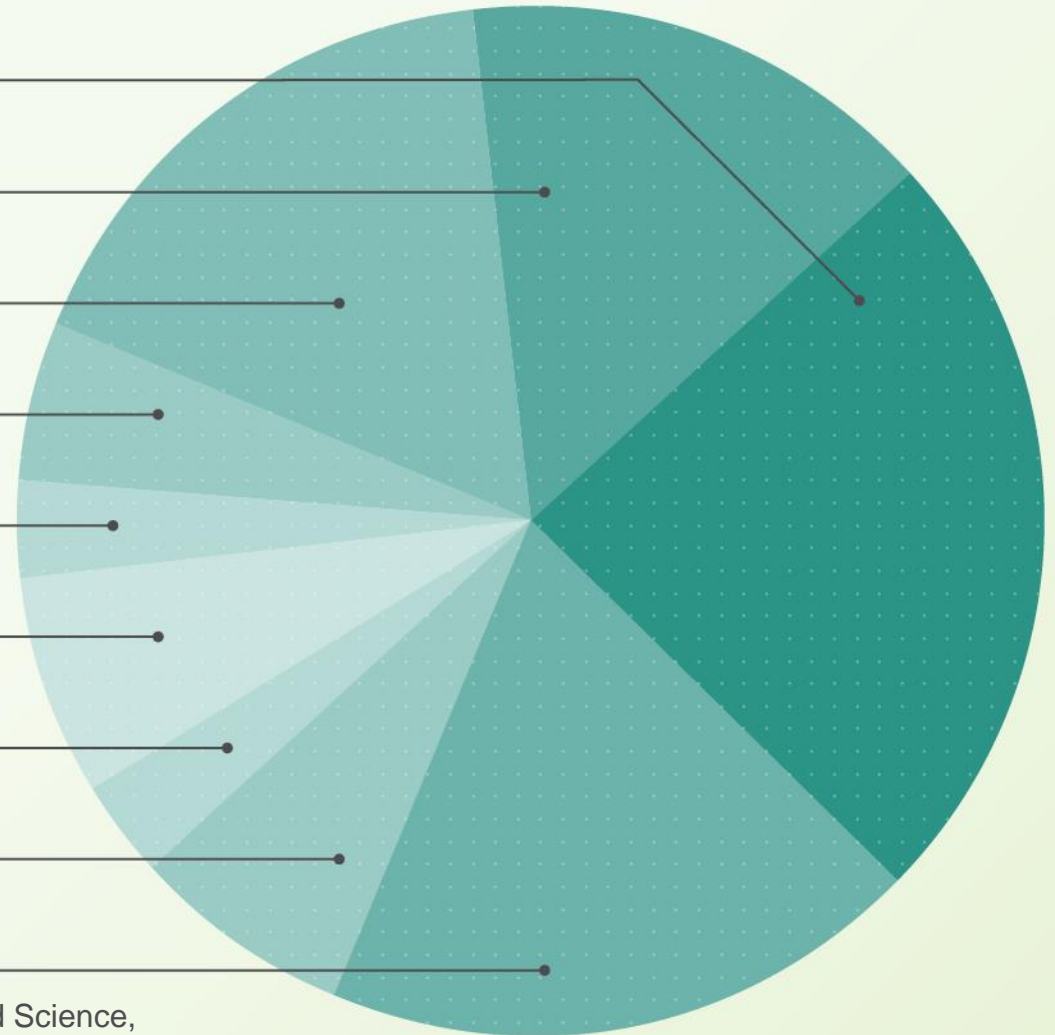
3% Psychology

7% Engineering

3% Health

7% Environmental Science

19% Other



Other includes: Computer Science, IT, Food Science, Sociology, Nanotechnology, Geology, Urban Ecology, Anatomy & Physiology

Key Initiatives

The R&D STEM Learning Exchange is implementing three key initiatives to reach its goals

STEM Challenges



Mentor Matching Engine



Resource Repository



We continue to grow and scale the reach of the R&D Learning Exchange, especially to under-represented groups within STEM careers.



STEM Challenges

STEM Challenges offer high school students the opportunity to investigate and solve problems relevant to Illinois industry.



Motorola Mobility
Foundation

Baxter

TGG
GROUP



MOTOROLA SOLUTIONS
FOUNDATION

NORTHROP GRUMMAN



ComEd

An Exelon Company





STEM Challenges



Address the problem of low participation in pediatric studies in one of Takeda's therapeutic areas and recommend solutions for increasing participation, which might specifically target compliance and diversity.

Maine South High School

Hinsdale Central High School

Waukegan High School



Motorola Mobility
Foundation

How might we use mobile phones to investigate and solve a current problem for people in our local or, possibly, global community? What would it take to make these new or new uses of technologies work, and what are their potentials for future applications?

Niles North High School



Challenge Timeline

SUMMER 2015

Develop Challenges and match with schools. Identify mentors.

FALL 2015

Build relationships with partner schools, planning for implementation, teacher Professional Development

JANUARY 2016

Kick off challenge with students

JANUARY-MAY 2016

Support student research through Mentor Matching Engine and 2-3 in person engagements

MAY 2016

Students showcase research solutions at partner event and larger culminating event with all partners and schools

STEM Challenges: Student Showcase Highlights

On May 20th, students from 16 high schools across Illinois presented their research and solutions to over 200 industry partners university representatives, and their peers.

Solutions ranged from building athletic wear to detect heart abnormalities, to creating a Hydroswale to address urban flooding, and developing a mat powered by pressure to generate power in emergency situations.



STEM Challenges: May 20th Event Highlights



STEM Challenges: May 20th Press & Social Media

WGN News (TV)

Viewership: 1.45 Million

Chicago Inno (Online)

Readership: 18,222

Chicago Trib/ Pioneer Press (Online + Print)

Readership:

Online: 319,000

In Print: (suburb only) 45,000

Oak Park Forest Leaves, Skokie Review

Glenview Announcements

News-Gazette (Champaign-Urbana)

Students rise to the (STEM) Challenge

Subscribers: 41,969



Microsoft Blog Post

Lake View High School Students Shine at
STEM Learning Exchange Challenge

STEM Connector

STEM Daily national newsletter feature
10,000 subscribers

 Social Media

#STEMChallenge trending on Twitter

Over 450 tweets related to event



Mentor Matching Engine



The **Mentor Matching Engine (MME)** is an online platform that connects Illinois high school students and their teachers to STEM professionals to support and enhance student-led research through virtual mentoring.

MENTOR MATCHING ENGINE About Help Center

GET EXPERIENCE BEYOND THE CLASSROOM WITH MME.

Presented by

STEM Learning Exchange IMSA

Log In

Email Address

Password

Sign In [Forgot Password?](#)

THIRD WAVE ILLINOIS SCIENCE & TECHNOLOGY INSTITUTE NORTHWESTERN UNIVERSITY Tellabs

MENTOR MATCHING ENGINE Projects Invitations People Help Center DC

Education and Technology

Details **Discussion** Documents

DC Say Something

Post

DC **David Castillo** March 12, 2015

Ship it venture capital agile sticky note experiential big data parallax thinker-maker-doer latte fund. Prototype thought leader fund integrate actionable insight thinker-maker-doer earned media grok driven 360 campaign ideate human-centered design thinker-maker-doer. Minimum viable product big data engaging responsive parallax cortado big data prototype pivot pitch deck. Pair programming parallax physical computing co-working piverate viral user story physical computing co-working agile prototype.

DC **Jaime Gorbin** March 12, 2015

Ship it venture capital agile sticky note experiential big data parallax thinker-maker-doer latte fund. Prototype thought leader fund integrate actionable insight thinker-maker-doer earned media grok driven 360 campaign ideate human-centered design thinker-maker-doer. Minimum viable product big data engaging responsive parallax cortado big data prototype pivot pitch deck. Pair programming parallax physical computing co-working piverate viral user story physical computing co-working agile prototype.



Student Case Study: Mentor Matching Engine

Sruti Mohan, a sophomore from Neuqua Valley High School, worked with mentor Jeffrey Liu, a PhD student at Northwestern in the Interdepartmental Program in Biological Sciences

“It’s really nice to see someone who’s been doing research for a while. It gives you this opportunity to say I haven’t been doing much but this person really knows what he’s doing, so he can guide me in this way. I don’t know what to do at this point, he can guide me here, and then I can get to the next step.”

The screenshot shows the Mentor Matching Engine web application. At the top, there is a navigation bar with the logo and menu items: Home, Resources, About the Partners, and Roles at a Glance. The main heading is "The Effect of Biochar Filtration on Water Pollutants". Below this, there is a sidebar with navigation options: Project Home, Document Library, Project Calendar, and Collaboration. The main content area is titled "Blog Experimentation" and includes a date and time stamp (12/4/13 9:36 PM) and a "Hi Mr." greeting. The blog post content reads: "I have actually completed my Review of Literature, and am now starting my experimentation. I have made some changes, from my original outline, and I have put below my Procedure." The procedure is listed as follows:

1. Gather materials.
2. Begin to contaminate the waters with the 3 chemicals (Phosphate, Nitrate, and Chlorine), by adding the required amount into the water. Each trial should contain about a liter of water.
3. Set up an area for the water filter and trials to be tested.
4. Begin the construction of the biochar filter (still doing research as to how to do this).

Below the blog post, there is an "Activities" section with a date separator for January 8. It shows two comments from Jeffrey Liu:

- Jeffrey commented on Sruti's blog entry, "It's also worth noting if you were unsure that che..." at 7:39 PM.
- Jeffrey commented on Sruti's blog entry, "Hi Sruti Biochar is a precursor to make activated..." at 7:21 PM.

A date separator for December 26 shows a comment from Sruti on Jeffrey's blog entry, "Hi Mr. Liu, I am making a..."



Student Case Study: Mentor Matching Engine



Project about the Efficacy of Cranberry Juice in the Prevention and Treatment of Urethritis

Washington Community High School student matched with a Corporate EHS Manager from Baxter

MENTOR MATCHING ENGINE Home Resources About the Partners Roles at a Glance

Efficacy of Cranberry Juice in the Prevention and Treatment of Urethritis


[Monica](#)

Looking at your progress I think is going pretty good. Something that I would add, and it's just a thought, is to repeat the following procedure ("We streaked six plates with cranberry juice and allowed it to dry for several minutes, then streaked the entire plate with E. coli. We also did the same with neomycin ointment") with another substance, like another type of juice that won't have the same effect we are trying to prove with the cranberry juice.

Posted on 2/19/15 2:50 PM.


[Rebekah](#)

Are there any specific juices that you would recommend trying? Would something like apple juice work? Should we try to find something with the same acidity as the cranberry juice to see if it is the acidity that is causing the bacteria not to grow? Thanks for your advice and time!

Posted on 2/19/15 7:12 PM in reply to [Monica](#)


[Monica](#)

I think that is a great idea, lemon juice is as acidic as cranberry juice, so that might be an option. And something I thought is to use one with a more neutral pH, like a dilution of Guava or Mango nectar, to see the difference and either accept or discard the acidity effect.

Posted on 2/20/15 10:19 AM.


[Rebekah](#)

Okay. We will try to do that next week! Thank you so much for your input! Just so you know our timeframe, I believe that all of the test taking should be wrapped up by the end of next week. After that, we have until March 4th to finish up the presentation and our lab write-up. Thanks again!



Resource Repository

The screenshot shows the website's search and browse interface. At the top, there are navigation links: "Browse Resources", "Contribute", "About Us", "Discover R&D", and "Contact Us". On the left, a large graphic features the "R&D STEM LEARNING EXCHANGE RESOURCE REPOSITORY" logo. The main content area is titled "SEARCH THE REPOSITORY" and includes a search bar with the placeholder "Enter search terms here", a yellow "SEARCH" button, and a teal "BROWSE TOPICS" dropdown menu. Below this is a link for "Browse All Resources". The "BROWSE THE REPOSITORY" section has two dropdown menus: "Find resources for..." and "Interested in...", both with "SELECT ONE" options, and a yellow "SUBMIT" button. At the bottom of the screenshot, a yellow banner reads: "THE R&D STEM RESOURCE REPOSITORY IS THE HUB FOR RESEARCH & DEVELOPMENT STEM LEARNING IN ILLINOIS".



The STEM Resource Repository offers teachers, students and parents access and connections to over 100 high-quality R&D focused program and resources from 50 leading organizations.

RDLE Participation

1500

Students working on STEM Challenges or matched with mentors 1:1 on the Mentor Matching Engine

350

Industry and University mentors supporting RDLE students

325

Student-led research projects.

53

Teachers leading students and participating in professional development.

28

High Schools partnering with the R&D STEM Learning Exchange

Metrics: Evaluation Questions

Implementation: Is R&D STEM Learning Exchange programming being implemented on schedule and as planned?

Effectiveness: Are the three initiatives (STEM Resource Repository, STEM Challenges, and Mentor-Matching Engine) of the R&D STEM Learning Exchange Program operating effectively? How might they be improved?

Impact: What student/teacher outcomes are associated with participating in the R&D STEM Learning Exchange program? What is the value-added of participants in the R&D STEM Learning Exchange program?

Sustainability: What elements of the R&D STEM Learning Exchange are being sustained and how? What barriers to sustainability exists and how can they be sustained?

Metrics: Data Sources

Where do we get our data?

- Teacher Data (Pre/Post)
- Student Data (Pre/Post)
- Teacher Focus Group
- Teacher Interviews
- RDLE STEM Challenge Student showcase observation
- Professional development observation

Testimonials

The STEM R&D challenge was an amazing experience and I would recommend it to any student that would be interested. One of my favorite parts of the project was the brainstorming session. This took place on the first day, everyone met after school and we came up with over a hundred ideas. From there we began narrowing it down until we came up with our final idea. I have taken multiple Project Lead the Way courses where we have done something like this on a smaller scale, but it was amazing to be able to present our final idea to over two hundred people.

I hope that not only does our program continue to do projects like this one, but other schools take part as well. It gives students an idea of what becoming an engineer is going to be like and it is amazing to be able to present and get feedback from professionals in the field. I cannot wait to see what the challenge is and what team comes up with next year.

- Gracie, Senior at Palatine High School

It was truly a great experience being involved with the coalition and the culminating event was very rewarding. I hope the event was just a sign of great things to come in our partnership together. Again thank you for a very humbling experience, many years from now hopefully I can look back on this and say I help shaped the future Innovators and Entrepreneurs.

- Sandy, Mentor, Motorola Mobility Foundation

Testimonials

It's definitely been the opportunity for the students to see some of the other ideas that are being come up with by their peers and other schools around the state. One of the things that students felt like they really benefited from this year was seeing other projects, other solutions to other challenges. A lot of them, especially the young ones, really got cool ideas about things that they wanted to do for future years, so that they would have the opportunity to kind of show off some the cool ideas that they have on some of the similar challenges they have seen other groups do.

- RDLE Partner Teacher

Teachers reported that their teaching style had changed due to participating in the RDLE program. As a result of using Problem Based Learning (PBL) in the STEM Challenge, teachers reported that they are now incorporating PBL into their curriculum as well as in other classes. Further, participating in the RDLE encouraged teachers to ask more open-ended questions to their students, and have begun giving students more freedom and time for their ideas.

Wrap up

Q&A

Questions?

Contact the R&D STEM Learning Exchange

For more information, please contact me at allie@istcoalition.org