We prepare children for success.

since 2007
30,000
participants
reached

Research has shown that the most successful students are those who are able to ***drive their own learning***. They employ a level of strategic thinking and regulation that involves more than just knowledge of strategies and the ability to execute them properly (McCombs & Marzano, 1990; VanZile-Tamsen, 1996; Winne, 1995; Zimmerman, 1995). It requires considerable attention, effort, and perseverance (Wolters, 1998), curiosity, a desire to understand, enthusiasm, willingness to take risks, and persistence (Garcia & Pintrich, 1992).

The short term benefits can be seen in academic performance in school. But the benefits carry over much further - into the workplace. And given the changes in the world of work as a result of globalization and technological developments, traits such as curiosity, creativity and persistence have become very important predictors of job performance - much more so than just academic performance. (Test scores measure comparatively brittle and inert skill sets that are inapplicable in a complex, fast-changing world.)

Research shows that employees with high levels of curiosity and persistence learn more new skills, master new challenges, do not get stressed out by novel situations and are able to adapt more efficiently with changes in core tasks, teams, and the organization (Allworth & Hesketh, 1999; Pulakos, Arad, Donovan, & Plamondon, 2000, Mussel, Spengler, Litman, and Schuler, 2012). Based on this research and our own hard work over the past 8 years, we decided to focus on **Curiosity**, **Creativity** and **Persistence** as the Big Three Gains we would help develop for our students.

This year was a very special year. We came out of a long period of experimentation and discovery, supported generously by the National Science Foundation and the Office of Naval Research. We spent the earlier part of 2014 reflecting on many years worth of student learning data and determining what we would focus on and what we would not do.



The only factor that predicts a student's higher academic achievement, social competence, low rate of adolescent high-risk behavior, higher aspirations for postsecondary education and strong career development is **Parental Involvement**. [12-18]

We focused on two programs:



90% of participating families **talked more about science** and watched more science shows

CURIOSITY MACHINE



technovation

Curiosity Machine: connecting STEM experts to underserved families over many years.

Of engineering students,

86%

were more proficient teaching complex science ideas to a non-scientist audience after our science communication training

The 4-stage model combines our key strengths:

- Parental involvement
- Deeply engaging STEM professionals as instructors and long-term mentors
- Blending technology and in-person programs for scale and depth

Effectiveness has been demonstrated through an external evaluation of the 5-year longitudinal NSF-funded project, Be a Scientist, which identified a variety of significant learning gains for participating engineers, children and their care-givers.

Engineers gained leadership, self-efficacy, commmunication skills, and productivity. Parents increased their involvement in forging STEM identities in their children. Of students, 92% were more interested in science at school and 97% of children were more excited about doing challenging activities.

Most notably, 90% of families talked more about science, watched more science shows and read more science books at home and 65% did more science-activities at home such as building things, playing with science kits and going to museums and zoos[10].



Train Scientists & Engineers

to develop and teach design challenges to underserved families



Produce & Share Videos Online

to inspire and make science accessible to everyone



Mentor Online

so families anywhere can learn directly from scientists & engineers



Train Parents & Educators

to use online design challenges and reach more families

Curiosity Machine: mentor story

quote?

Jessica began volunteering with Iridescent in January of 2014 through our Engineers as Teachers program (a sub-program of Curiosity Machine). At the time she was an undergraduate student at Biomedical Engineering at USC and an active tutor and teacher within the community. As a part of the Engineers as Teachers course, she developed quality lesson plans and STEM curriculum and vtaught a 5-week course for children and families based on her lesson plans in a local, underserved elementary school. One of her lessons helped children build a design challenge based on the physics of a roller coaster.

After the Engineers as Teachers program, Jessica continued to stay involved with the Iridescent community through Curiosity Machine. As an online mentor, Jessica has supported students at local Los Angeles schools and libraries as well as virtually mentoring families across the country using Curiosity Machine. Currently she is a first year PhD student in Neuroscience at the University of Michigan, Ann Arbor. Her research focuses on factors regulating restorative neurogenesis in response to traumatic brain injury. Aside from academic studies, Jessica has been highly involved in educational activities with the community in Ann Arbor as well.

Through her dedication to providing support to the most at-need members of her community, Jessica has modelled the significant impact mentors can have on inspiring the next generation of STEM leaders.

665

submissions to
Curiosity Machine 2.0
since launch
(Aug 2014 - Nov 2014)

462

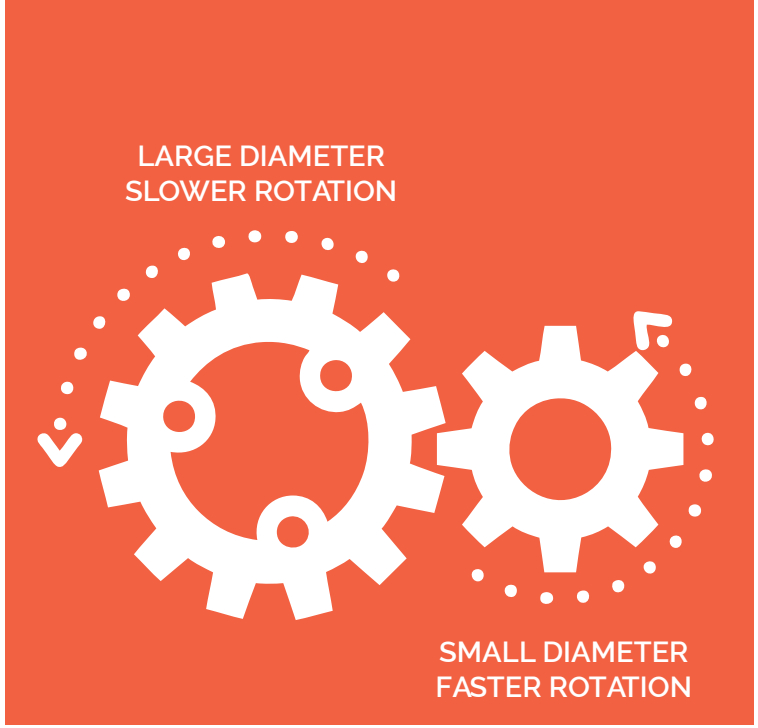
submissions to
Curiosity Machine 1.0
entire lifetime
(2012 to July 2014)

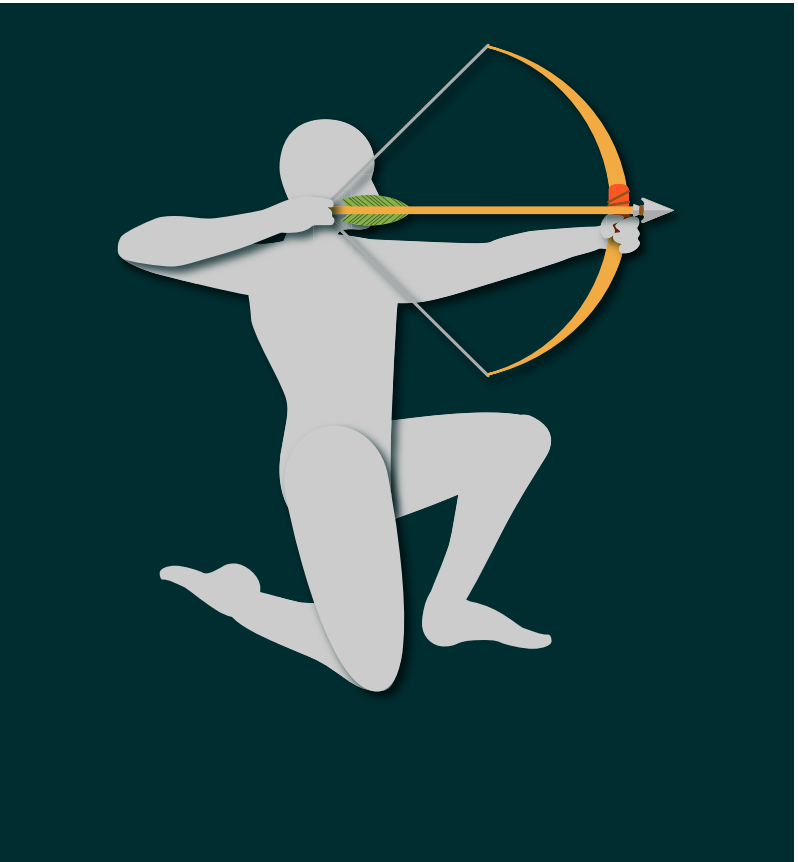


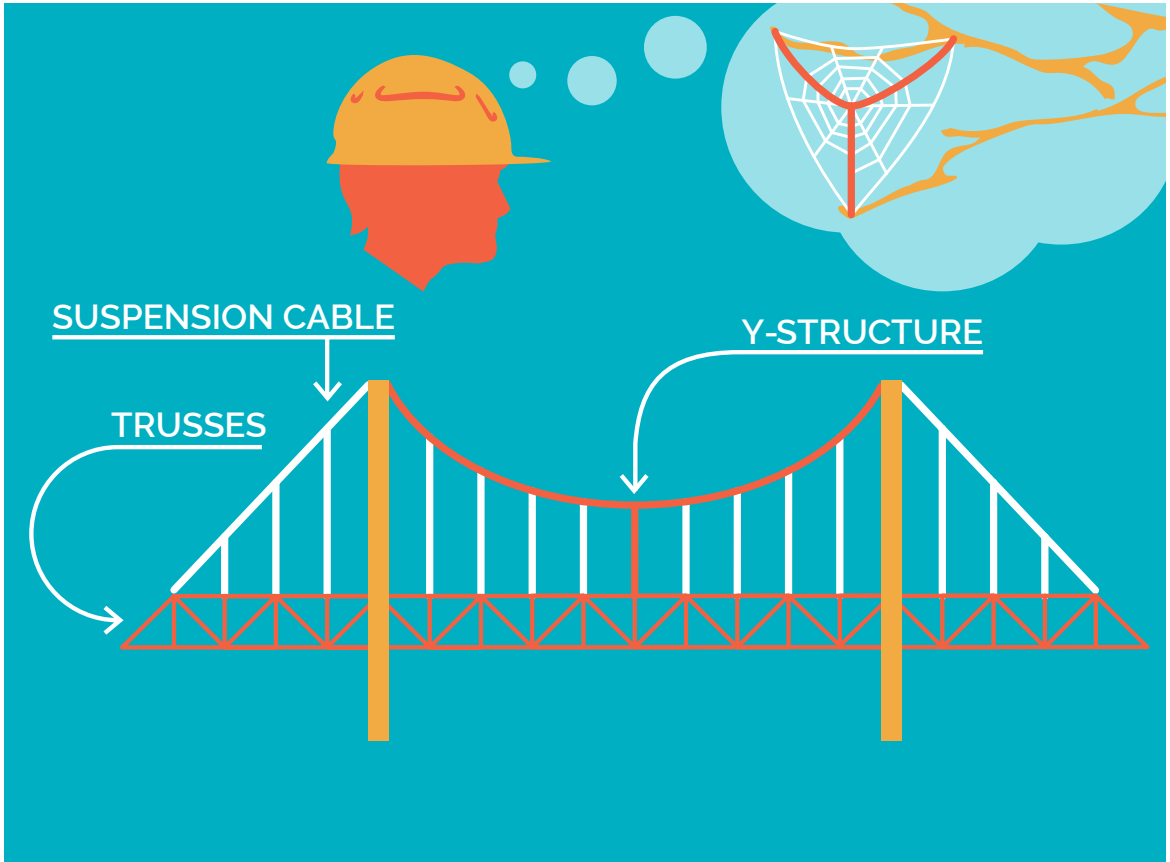
Corporate Social Responsibility activities can increase a corporation's financial performance - if there is already sufficient brand awareness in the public [35-36].

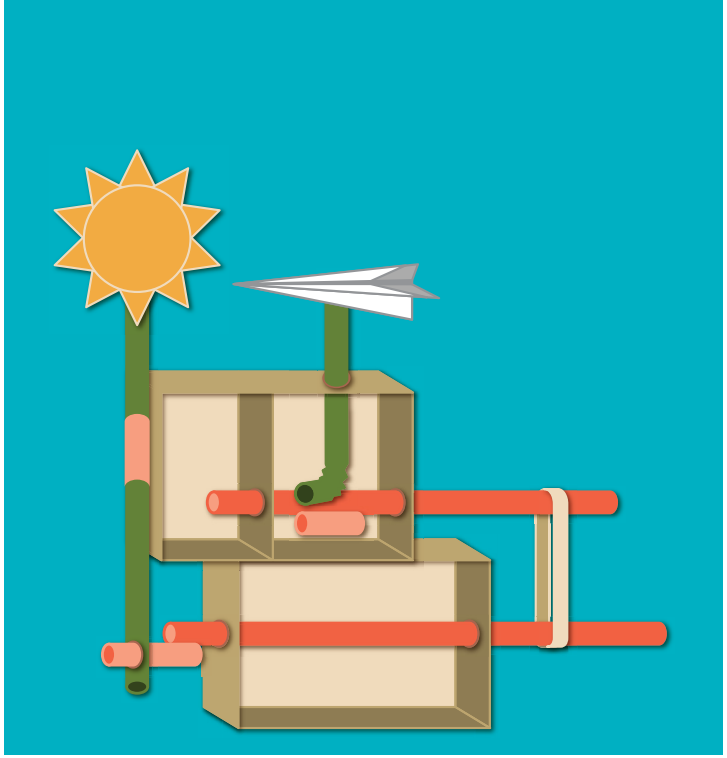
Curiosity Machine: curriculum

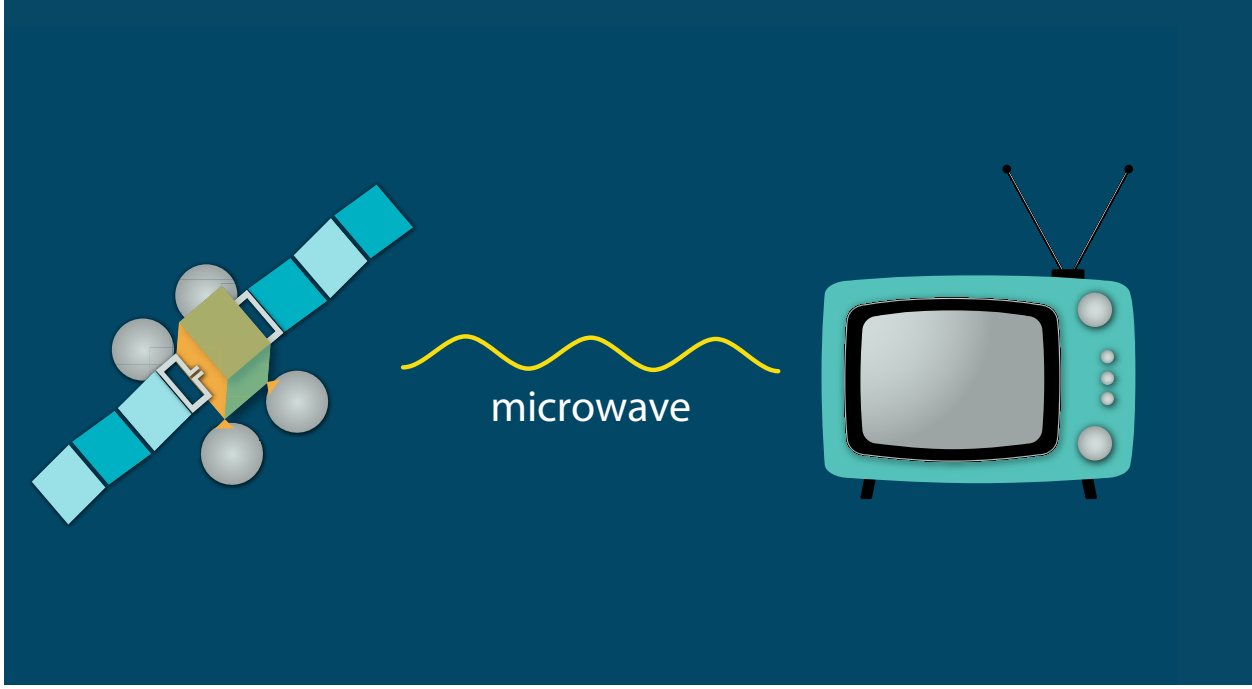
In addition to connecting children, parents, engineers, scientists, and educators for multiple interactions over many years, we create original hands-on projects that highlight cutting edge research in ways accessible to audiences of all ages and science backgrounds. This curriculum is developed through partnerships with leading researchers and professional engineers, and is designed to be executed with affordable and easy-to-find materials. In 2014, we produced 70 videos and project designs.

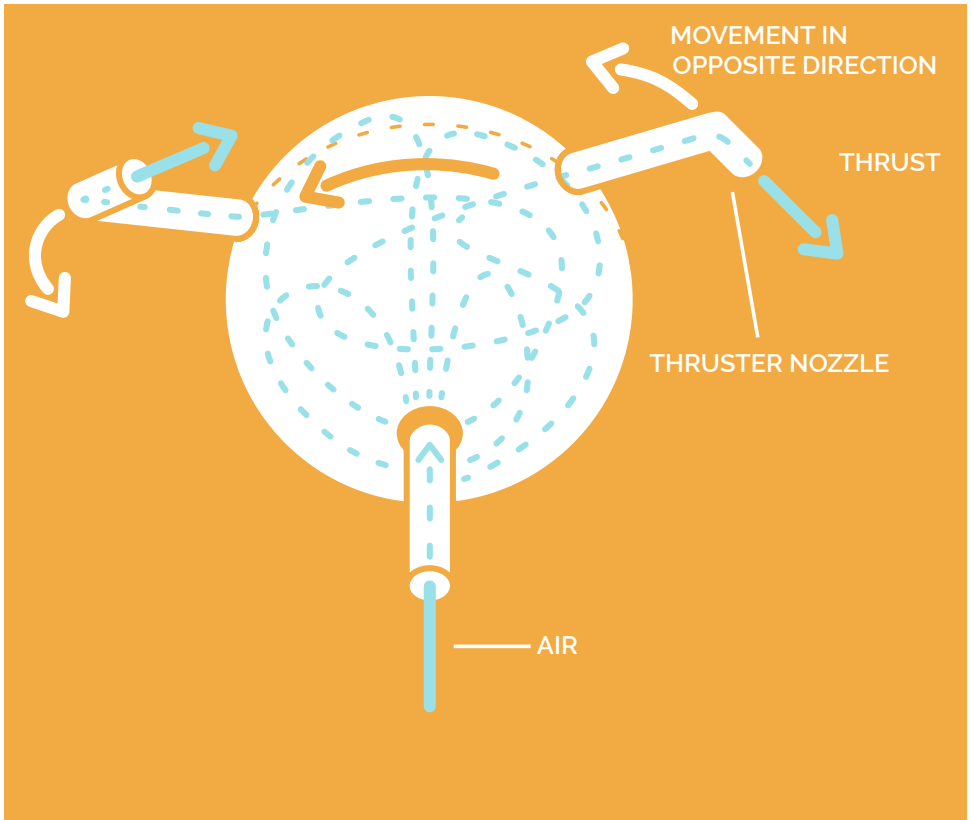


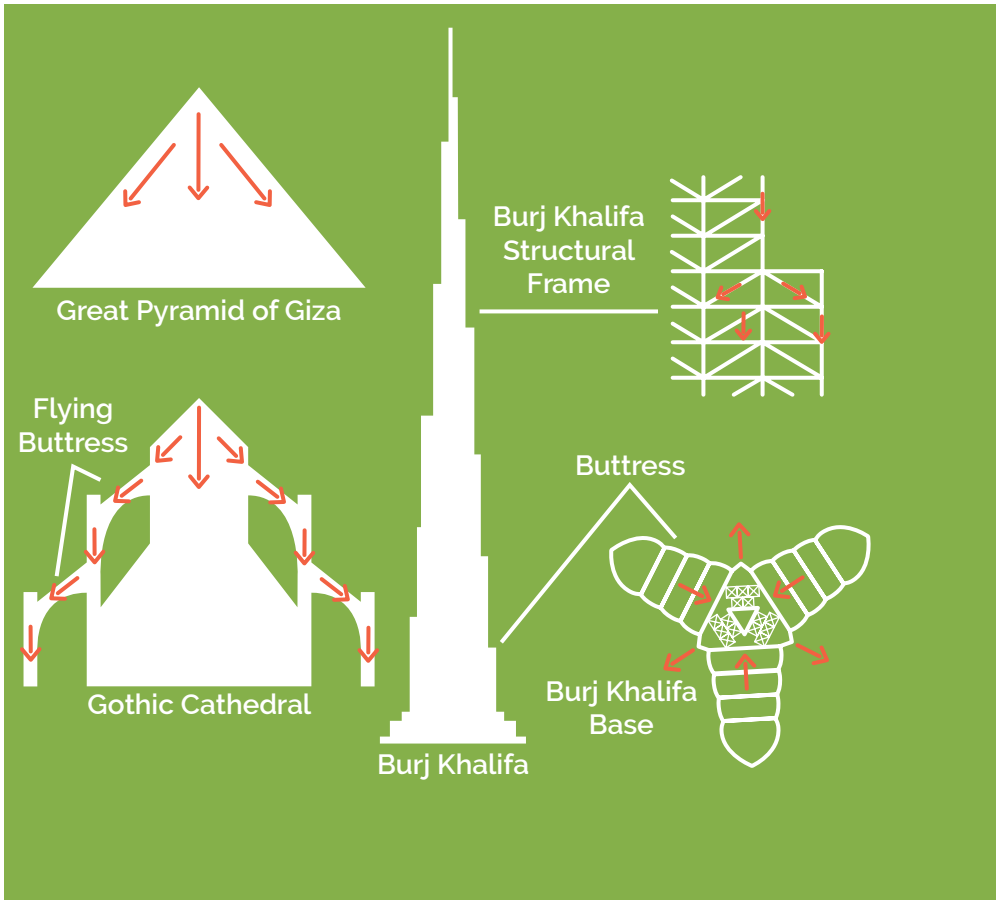







microwave


MOVEMENT IN
OPPOSITE DIRECTION
THRUST
THRUSTER NOZZLE
AIR

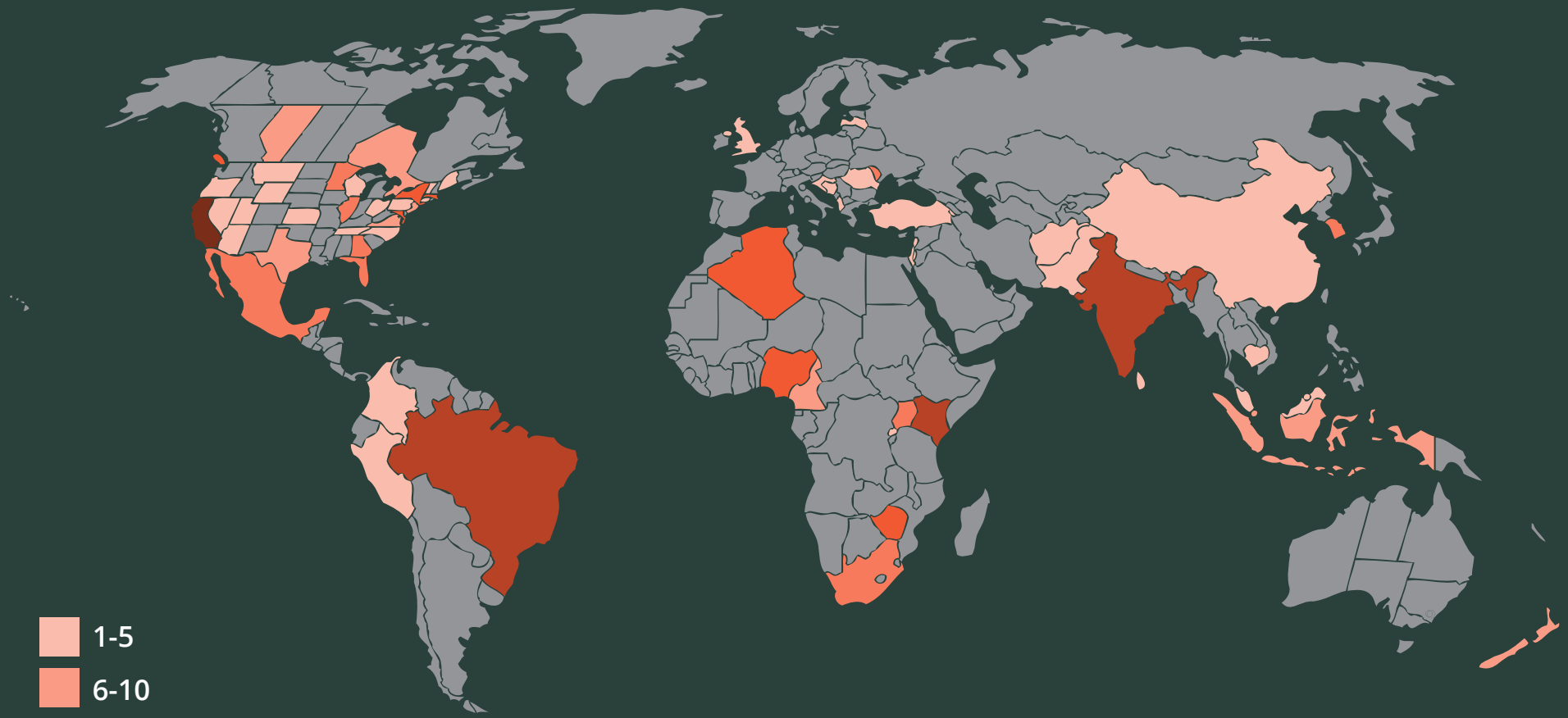

Great Pyramid of Giza
Burj Khalifa
Structural
Frame
Flying
Buttress
Gothic Cathedral
Buttress
Burj Khalifa
Base
Burj Khalifa

Technovation: building girls' confidence in tech entrepreneurship year after year

Technovation is now one of the longest running programs teaching girls how to program. Our challenge in the early years was to develop a scalable model that could provide high quality at low cost. We are now going into our 6th season having taught 2750 girls how to program mobile apps to solve problems in their communities and launch businesses.

Our focus is now going to be on increasing year-to-retention for the girls, providing advanced curriculum tracks so that the girls have ample opportunities to deepen their computing skills and building advisory boards for educators, coaches, mentors and girls.

Where we reached: 2014 registered teams



In 2014, Technovation brought technology entrepreneurship to girls in

28 countries

Board of Directors

Paul Yarin - Chair

While growing up in New Jersey, Paul Yarin helped create the Young Inventors' Club; this began his involvement in nonprofit science education. Paul is now an inventor, engineer, and educator whose passion is designing innovative electromechanical products. He is currently Director of Hardware Engineering at Oblong Industries, a computer tech startup developing a radically futuristic "spatial operating environment." His consultancy, Blackdust Design, has developed an interactive trainer for laparoscopic surgeons, RFID-based medication trackers, networked devices for retail environments, and interactive sensors and displays for exhibits. Paul studied human-computer interaction at the MIT Media Lab after earning a Master's in Mechanical Engineering from Stanford and a Bachelor's from the University of Pennsylvania. He has taught at Stanford and UCLA as well as in Iridescent's programs. His dream is that all children will one day have the chance to improve the world through invention.

Elyssa Elbaz - Secretary

Elyssa Elbaz manages the Elbaz Family Foundation, which supports environmental and educational causes. She is a former Assistant United States Attorney, where she was a member of the Violent and Organized Crime division. Prior to working as a prosecutor, she worked for the law firm of O'Melveny and Myers and clerked for a federal judge. She has also worked as a journalist for a number of newspapers and wire services in Los Angeles. Elyssa has a bachelor's degree in Politics, Philosophy and Economics from Claremont McKenna College and a Juris Doctor from the UCLA School of Law. She serves on the following non-profit boards: the UCLA Law Alumni Board, the Claremont McKenna College Center for Human Rights Leadership, Whole Child Foundation, and X Prize (as the ethics chairperson). She is also a partner of Los Angeles Social Venture Partners.

Aniket Ullal - Treasurer

Aniket Ullal is Senior Director at Standard and Poor's, a division of The McGraw-Hill Companies. Aniket Ullal has over 10 years of experience in launching and managing knowledge based businesses. He currently has product management responsibility for S&P's US Indices, including the widely tracked S&P 500 and S&P/Case-Shiller indices. He has also worked in McGraw-Hill's education business, where he helped launch a successful online formative assessment product for school districts. Previously he has worked as a business development manager at Infosys Technologies and as a consultant with Andersen. He is a graduate of Mumbai University, the Indian Institute of Management (Ahmedabad) and Northwestern's Kellogg School of Management.

Ulrich Aldag

Ulrich Aldag received a PhD degree in biochemistry from the University of Bonn, Germany.

In the first half of his professional career he worked for Shell Chemicals and Unilever, and later for in the medical diagnostics business of a German pharmaceutical company, Boehringer Ingelheim (BI).

For BI, Ulrich started up and established a specialized blood testing service laboratory that became the largest medical reference lab in Germany, employing 400+ people after a few years. Later on he served as Chairman Diagnostics Division for BI.

In the second half of his professional life, Ulrich co-founded, with younger colleagues, successively two German biotech start-ups: Qiagen (1985) and Evotec (1992). I served as CFO/COO/CEO in the nascent rough first years of their corporate lives. Both companies were taken to the stock market and have continued to thrive: Qiagen became one of the largest suppliers of molecular biology reagents and instrumentation in the world, and employs several thousand people; Evotec is a leading provider of drug discovery services to the pharmaceutical industry.

Ulrich choose management over R&D positions in my professional career. The starting-up of three high-tech companies from scratch has been my most fulfilling professional experience.

In 1999, Ulrich retired from Evotec and came to the United States thus ending my professional career and marrying for a second time. From my first marriage I have four children and ten grandchildren. In addition to trying to be a good grandfather, I am mastering the art of too many hobbies. Living in Portola Valley, just above Stanford University, I am a very active student in Stanford's

Continuing Studies program.

Chaitanya Ullal

Dr. Chaitanya Ullal is a Researcher in Material Science at the Max Planck Institute for Biophysical Chemistry, Gottingen, Germany. Dr. Ullal is a graduate from MIT with a PhD in Materials Science and Engineering. He holds a B. Tech degree in Metallurgical Engineering and Materials Science from the Indian Institute of Technology (Bombay)and was a visiting researcher at Bell Labs (Lucent Technologies, Murray Hill, 2002-2003). Dr. Ullal has co-authored articles in leading peer reviewed scientific journals including publications from the Nature Publishing Group, American Physical Society, American Chemical Society, Optical Society of America, American Institute of Physics and the Wiley Publishing group. Dr. Ullal has 2 pending U.S. patents.

Eva Ho

Eva Ho As the VP of Marketing and Operations at Factual, Eva manages all aspects of the brand, insides sales, HR and finance. In 2008, she co-founded Navigating Cancer, a website and tools that empower cancer patients to navigate their best care. She is also very active in the non-profit sector, founding Whole Child LA in 2008, a community pediatric pain clinic, and sits on the board of First Descents and Iridescent. Prior, she was a Senior Product Marketing Manager at Google and Youtube for 5 years. Prior to Google, Eva was the head of marketing for Applied Semantics, a company that was sold to Google in 2003. Additional past employers include The Wilkerson Group, Procter & Gamble and IBM. Eva holds an MBA from the Cornell University Johnson School of Management as well as an AB in Biology from Harvard University.

Eva has a strong passion for providing underserved children, especially girls, with the knowledge base and toolset to become brilliant, capable, well-rounded engineers and scientists. When she saw firsthand the impact of Iridescent through the science centers and Technovation Challenge, it was a no-brainer to dedicate more energy and time behind this ultra-critical mission. She feels strongly that creative and effective STEM education to more children will be one of the key pillars that will drive accelerated innovation in the US and beyond.

Michael Kassner

Dr. Michael Kassner recently completed three years as the Director of Research for the Office of Naval Research (ONR). Early in his assignment the Secretary of the Navy, Ray Mabus, working with the White House, directed that ONR lead a new STEM effort for the US Navy, double in investment to $100 million/year and lead the Dept. of Defense in STEM innovation. Prof. Kassner spearheaded the funding of more than 144 innovative STEM outreach programs focusing on women and minorities. His pioneering work led to his being awarded the Navy's Meritorious Public Service Medal. Prior to the ONR assignment, he was the chair of the AME Department at USC. He has more than 37 years of experience in research and higher education and has over 200 published works.

Donald Lacey

Donald Lacey is a Managing Director at Citigroup Global Markets Asia. He sits on Iridescent's audit committee.

Don's attraction to Iridescent stems from his belief that societies are best served by making educational opportunities as broadly accessible as possible. He is an enthusiastic supporter of Iridescent's efforts to stimulate interest in science, engineering and mathematics in underserved communities.

Don is a magna cum laude graduate of Harvard Law School and studied mathematics and economics at MIT, where he received his SB. He commenced his career as an investment banker at Goldman, Sachs & Co.

Financial

Thank you to Our Sponsors

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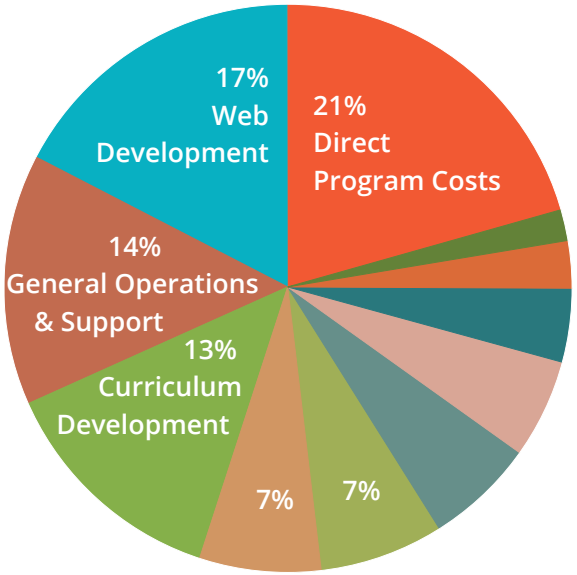
intel

HIVE

EXPLORE + CREATE + SHARE

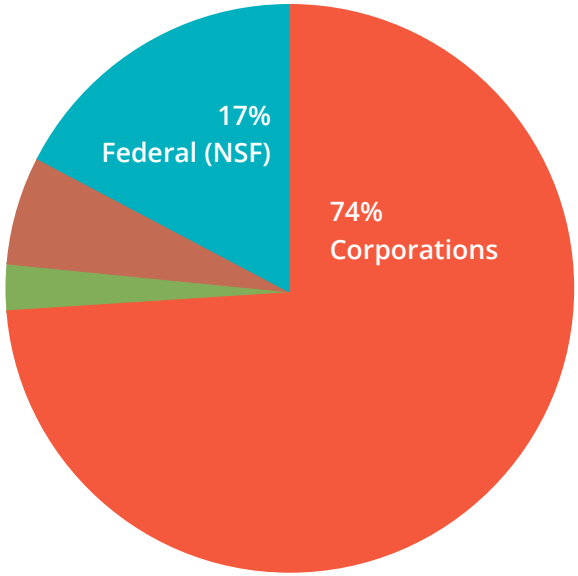
Our budget for 2014 was $3,174,616. The breakdown of expenses and income is as follows.*

Expense



- Partner Recruiting
- Partner Training
- Insurance & Liability
- Video Production
- Travel to Train Partners
- Assessment
- Dissemination

Income



- Private Foundations
- Individual Donations

*Projected amounts through December 2014.
Books closed as of October 31, 2014.

Goals: 2015

We have a magnificent team that believes deeply in the mission, is tenacious and models curiosity, creativity and persistence on a daily basis.

We have all the tools we need.

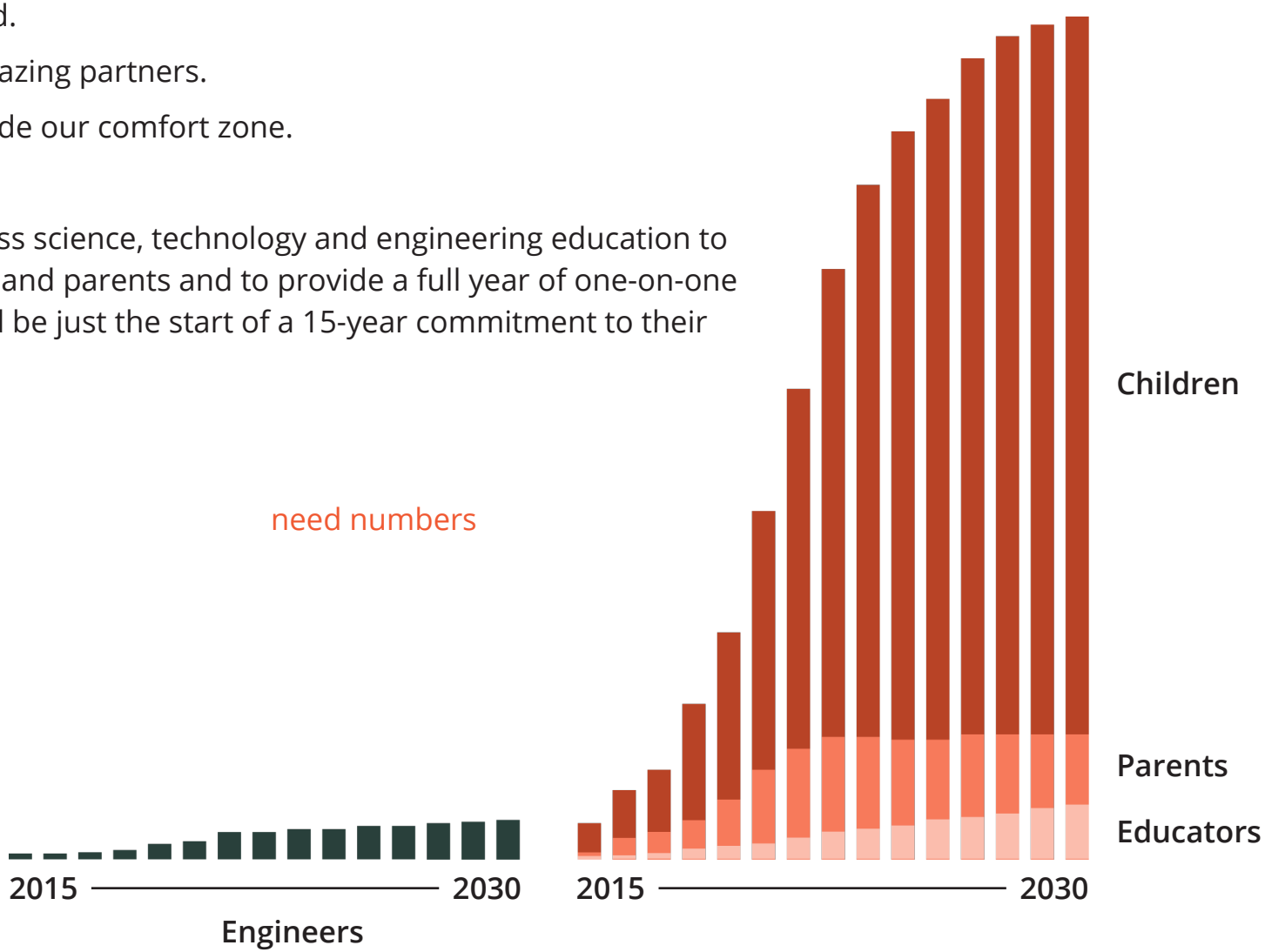
We have a strong base of amazing partners.

We are ok with working outside our comfort zone.

We have courage.

Our goal is to bring world-class science, technology and engineering education to 10,000 underserved children and parents and to provide a full year of one-on-one expert mentoring. This would be just the start of a 15-year commitment to their communities.

need numbers



Bibliography

1. **McCombs, B.L. and R.J. Marzano**, Putting the self in self-regulated learning: The self as agent in integrating will and skill. Educational Psychologist, 1990. 25: p. 51-69.
2. **Winne, P.**, Inherent details in self-regulated learning. Educational Psychologist, 1995. 30: p. 173-187.
3. **Zimmerman, B.**, Self-regulation involves more than metacognition: A social cognitive perspective. Educational Psychologist, 1995. 30: p. 217-221.
4. **Van Zile-Tamsen, C.M.**, Metacognitive self-regulation and the daily activities of college students. 1996, State University of New York: Buffalo.
5. **Garcia, T., & Pintrich, P. R.**, Critical thinking and its relationship to motivation, learning strategies, and classroom experience., in Centennial Annual Convention of the American Psychological Association. 1992, ERIC Document Reproduction Service No. ED 024 644: Washington, DC.
6. **Allworth, E. and B. Hesketh**, Construct-oriented biodata: Capturing change-related and contextually relevant future performance. International Journal of Selection and Assessment, 1999. 7: p. 97-111.
7. **Pulakos, E.D., et al.**, Adaptability in the workplace: Development of a taxonomy of adaptive performance. Journal of Applied Psychology, 2000. 85(612-624).
8. **Mussel, P., et al.**, Development and validation of the German work-related curiosity scale. European Journal of Psychological Assessment, 2012. 28(2): p. 109-117.
9. **Ba, H.**, Investigating the Implementation of the Be a Scientist! Project in New York City and Los Angeles: Formative Evaluation, Year One. 2011, Center for Children and Technology, Education Development Center.: New York.
10. **Ba, H.**, Investigating the Implementation of the Be a Scientist! Project in New York City and Los Angeles: Formative Evaluation, Year Two. 2012, Center for Children and Technology, Education Development Center.: New York.
11. **Presser, A.L.**, THE CURIOSITY MACHINE EVALUATION: Final Report. 2014, Education Development Center, Inc., Center for Children and Technology.
12. **Caplan, J., Hall , C., Lubin, S., & Fleming. R.**, Parent involvement: Literature review of school-family partnerships. 1997; Available from: http://www.ncrel.org/sdrs/areas/pa0cont.htm.
13. **D., R.M., et al.**, Protecting adolescents from harm: Findings from the National Longitudinal Study on Adolescent Health. Journal of the American Medical Association, 1997. 278: p. 823-832.
14. **Christenson, S.L. and S.M. Sheridan**, Schools and families: Creating essential connections for learning. 2001, New York: Guilford Press.
15. **C., W.-S., M.J. Reid, and M. Hammond**, Preventing conduct problems, promoting social competence: A parent and teacher training partnership in Head Start. Journal of Clinical Child Psychology, 2001. 30: p. 283-302.
16. **Henderson, A.T., & Mapp, K. L. and A.**, synthesis, A new wave of evidence: The impact of school, family, and community connections on student achievment., in National Center for Family and Community Connections with Schools. 2002: Austin, TX.
17. **Patrikakou, E.N.**, Adolescence: Are parents relevant to students' high school achievement and post-secondary attainment? 2004 [cited 2014 Dec 10]; Available from: http://www.hfrp.org/publications-resources/browse-our-publications/adolescence-are-parents-relevant-to-students-high-school-achievement-and-post-secondary-attainment.
18. **Jeynes, W.H.**, A meta·analysis of the relation of parental involvement to urban elementary school student academic achievement. Urban Education, 2005. 40: p. 237-269.
19. **Kashdan, T.B. and J.E. Roberts**, Social anxiety's impact on affect, curiosity, and social self-efficacy during a high self focus social threat situation. Cognitive Therapy and Research, 2004. 28: p. 119-

141.

20. **Kashdan, T.B. and M.F. Steger**, Curiosity and pathways to well-being and meaning in life: Traits, states, and everyday behaviors. Motivation and Emotion, 2007. 31: p. 159-173.
21. **von Stumm, S., B. Hell, and T. Chamorro-Premuzic**, Neugier als dritte Säule der Studienleistung [Curiosity predicts academic performance], in 47 Congress of the Deutschen Gesellschaft für Psychologie. 2010: Bremen, Germany.
22. **Sternberg, R.J.**, Answering questions and questioning answers. Phi Delta Kappa, 1994. 76: p. 136-139.
23. **Gallagher, M.W. and S.J. Lopez**, Curiosity and well-being. The Journal of Positive Psychology, 2007. 2(236-248).
24. **Swan, G.E. and D. Carmelli**, Curiosity and mortality in aging adults: A 5-year follow-up of the Western Collaborative Group Study. Psychology and Aging, 1996. 11(449-453).
25. **Orlitzky, M., F.L. Schmidt, and S.L. Rynes**, Corporate Social and Financial Performance: A Meta-analysis. Organization Studies, 2003. 24(3): p. 403-441.
26. **Servaes, H. and A. Tamayo**, The Impact of Corporate Social Responsibility on Firm Value: The Role of Customer Awareness. Management Science, 2013. 59(5): p. 1045-1061.
27. **Shelly, M., S. Melissa Ann, and P. Lawrence**, CSR: a case for employee skills□based volunteering. Social Responsibility Journal, 2013. 9(3): p. 479-495.
28. **Wood, E.**, "What About Me?' The Importance of Understanding the Perspective of Non-Managerial Employees in Research on Corporate Citizenship, in Managing Corporate Social Responsibility in Action: Talking, Doing and Measuring, F.d. Hond, F.G.A.d. Bakker, and P. Neergaard, Editors. 2007, Ashgate Publishing: Aldershot, Hampshire. p. 111-125.
29. **Greening, D.W. and D.B. Turban**, Corporate social performance as a competitive advantage in attracting a quality workforce. Business and Society, 2000. 39(3): p. 254-280.
30. **Lopez, M.H., A. Gonzalez-Barrera, and E. Patten**, Closing the Digital Divide: Latinos and Technology Adoption. 2013, Pew Hispanic Center: Washington DC.
31. **Smith, A.**, African Americans and Technology Use: A Demographic Portrait. 2014, Pew Research Center.

It takes a village parent mentor to raise a child.

Especially one who is curious, creative, and persistent.

Especially one who will set her own goals, drive her own learning, and solve the world's biggest problems.