Chief Operating Officer, Iridescent

Iridescent is a science and engineering education non-profit organization that trains scientists, engineers and technology professionals to develop and teach project-based lessons for underserved children and youth. We believe in long-term impact and require strong parental involvement.

Since Iridescent was founded in 2006, it has trained ~400 engineers and technology professionals who have reached ~9000 children in Los Angeles, New York City and the San Francisco Bay Area.

Our vision is to be the premier institution that helps STEM professionals communicate their passion to children through real-world projects.

This document outlines the following:

- Who are we looking for
- Our Programs
  - Technovation Challenge
  - Engineers as Teachers
  - Family Science Courses
  - Iridescent Science Studios
  - 50-50-50
- Iridescent Culture
- Responsibilities and Outcomes for the first year
- Screening Tasks
  - Technovation Screening Task
  - Engineers as Teachers Screening Task
  - Family Science Screening Task

Who are we looking for

Characteristics of an ideal team member (in order of priority):

- Iridescent’s Mission – You must really want to join the team and be part of the mission.
- Entrepreneur – You must take full ownership of the program and project, thrive on freedom, understand what it means to be fully accountable, and not be scared of jumping into and starting new projects
- You must have an insatiable thirst for learning and be a dedicated reader.
  - You should be able to transfer learning and suggest innovative solutions to projects and problems.
- High standards – You will not tolerate mediocre results or work
  - Pay attention to detail – You accord the same amount of attention and love to every task – no matter how small.
• Strong work ethic – You are not scared of pulling allnighters to get the job done. You will go the extra mile. Iridescent is still a startup and needs you.
• Devoted to team – You devote effort to developing strong relationships with the team and getting alignment/investment from others for new ideas. You always put the team first – even before your own needs.
• You love to build, create, tinker and hack.

Location: San Francisco Bay Area
Position Title: Chief Operating Officer, Iridescent
Minimum Qualifications:
• Masters degree in science, engineering, technology or mathematics
• 2-3 years experience in the hi-tech industry

Our Programs

Technovation Challenge
The Technovation Challenge encourages girls to pursue careers combining technology and entrepreneurship. Our goal is to inspire them to see themselves not just as users of technology, but as inventors, designers, builders and entrepreneurs.

Through the Technovation Challenge we partner high-school girls with university and professional women in computer science and technology over a period of 9 weeks. The girls learn the basics of programming and develop phone apps using App Inventor (a Scratch-based, visual programming language). They also learn about entrepreneurship and marketing and pitch their idea to a panel of VCs at the end of the 9 weeks. The program has been supported by Google, Microsoft, LinkedIn amongst many others.

Huffington Post article about our research-based approach: http://www.huffingtonpost.com/tara-chklovski/girls-as-inventors_b_808236.html
Huffington Post article about the NYC Pitch Night: http://www.huffingtonpost.com/angela-haines/girl-tech-inventors-and-m_b_868829.html

We value mentorship and recognize it as the core attribute of growing entrepreneurs and entrepreneurship. We are also trying to coordinate mentor, entrepreneur, and investor activity in a scalable way. Our Spring 2010 program reached 45 girls in the Bay Area and our 2011 program reached 232 girls in the Bay Area, New York City and Los Angeles.

Challenge: To develop and implement a program structure (within the next five years) that will reach 200,000 girls annually while achieving the program’s objectives.

Engineers as Teachers
Engineers as Teachers is a university based program through which undergraduate engineering students receive technical elective credit for going through a 16-week training program during which they learn to communicate current research to underserved K-8 children and their families through hands-on experiments. The program was first started at the University of Southern California and has been running for five years (twice a year). The program has been running at The Cooper Union in New York City for two semesters as well.

Our vision is to develop low-cost experiments and lessons that can be easily implemented in third world countries. We will aim to partner with the Peace Corps and train their members to teach and implement these lessons worldwide.

Challenges: What balance do you strike between explaining concepts at a deep conceptual level, showing real world applications of the concepts while keeping audiences of 100 or more participants engaged? How do you train engineers and scientists with no teaching background to develop and teach highly engaging lessons in a short period of time (4-8 hours)? How can this model change so that we can train 50,000 engineers and scientists annually?

**Family Science Courses**

After going through the Engineers as Teachers training, the engineers teach a 4-5 week course to underserved K-8 children and their families. The sessions are held once a week at the school site.

Challenges: How do you recruit 100-150 participants for each course and consistently retain the participants through all sessions – year after year?

**Iridescent Science Studios**

We have physical spaces in Los Angeles and New York City through which we aim to provide long-term exploration opportunities to children within a 5 mile radius of the studios. We offer engineering studio field trips, 8-10 week long after-school projects, summer camps as well as semester long programs for high school students who facilitate many of the aforementioned programs.

Challenges: The studios have been recently opened. The challenge is to cost effectively provide a high dosage of programs that enable children to work on long-term projects year after year. We are aiming for depth and high quality at low cost!

**50-50-50**

Our goal (for the next three years) is to provide 150 STEM contact hours to each child that comes in contact with us. This comes from assuming a child is working every day of the year for half an hour on a project. Over the next five year we will aim to increase this to 2 hours every day (for a total of 600 hours/year).
• 50 hours would be provided through Iridescent’s programs. We will devote significant
time and effort to tracking participants.
• The next 50 hours would be provided through close partnerships with like-minded
organizations who are interested in tracking the growth of participants as well.
• The final 50 hours would be provided through an online “Student Learning Portal”
through which participants would be able to access all our curriculum (lesson plans,
books, videos etc), conduct their own experiments and submit videos and
photographs of their experiments. The portal would also provide a peer-review badge
system through which participants would be able to get feedback on their creations
and earn badges. There would be real-world rewards for the learning as well. For
instance, after earning five novice badges, participants could be rewarded by an
opportunity to visit a research lab at a university or corporate partner. And if they earn
twenty such badges, they would earn a summer internship.

Challenges: This is a new project and challenges would include:
• Consistently cleaning up content developed by the engineers and developing a
pipeline into the portal.
• Encouraging and supporting the use of the Portal amongst participants (many of
whom don’t have ready access to internet)
• The vision is to have 400 unique lesson plans added to the Portal every year.

Iridescent Culture

We value freedom, ownership, openness and learning. We also make our own rules.
Some resources that we have built into the system:

• Performance Rubric and Lionheart Award: http://iridescentlearning.org/wp-
content/uploads/2011/08/Lion-Heart-Award-Rubric.pdf
• Scorecard: This is a listing of key outcomes and responsibilities you would be
responsible for you and you would create this document. It is very similar to the job
description. In addition, you would have to add an honest assessment of your
strengths and weaknesses.
• Learning Goals for each Program: http://iridescentlearning.org/wp-
• Learning Assessment Tool for many of Iridescent’s K-8 programs:
18.pdf

Responsibilities and Outcomes for the first year

Each team member is accountable for their own program and its outcomes. The COO’s role
would be to check in weekly with the directors of each program and help the directors in
creative problem solving, connecting them with new resources and staying focused.
• Develop the Technovation Challenge into a program that will (in 5 years) reach more
than 200,000 girls annually.
• Develop the Engineers as Teachers program into one that will train 50,000 engineers and scientists annually.
• Develop the Family Science Course into one that recruits and retains 100-150 participants for each course.
• Develop and implement the Student Learning Portal
• Identify funding agencies and submit six grants (supported by the CEO)

**Screening Tasks**

We take the recruiting and screening process very seriously as we respect time. We ask that you do the same. We want to get to know you very well and would like to take this opportunity to do so. For this process to work well, we need your full cooperation and commitment! Please do not think that we are using this as an excuse to get some free work. As you full well know, it takes significant amount of time, effort, thought and resources to produce something of high quality.

We are still in the startup phase which is extremely demanding, high stress and unstructured. We are learning fast and trying our best to provide training and onboarding support. However, you will be in charge of leading new programs and that requires constant problem solving and developing innovative solutions.

Thus the only goal of this process is to determine whether you are the right match for Iridescent.

**Technovation Screening Task**

1. Review the Technovation Challenge curriculum and recommend a list of guest speakers for the sessions at each location. Describe why you chose these people and how you would go about contacting and engaging them. ([https://sites.google.com/site/technovationchallenge2011/curriculum](https://sites.google.com/site/technovationchallenge2011/curriculum))

2. How would you modify the Technovation Challenge program so that in 5 years it would engage more than 200,000 girls per season? Discuss the growth plan.

**Engineers as Teachers Screening Task**

To develop one project-based lesson plan (focused on any one of the concepts below). The lesson plan should embody Iridescent’s principles of learning.

• Buoyancy
• Streamlining as applied to underwater creatures
• Sound propagation through water
• Respiration in sea creatures

**Explanation Checklist**

1. Do you have a strong, clear, accurate analogy to explain the concept?
2. Do you have three engaging videos that explain the concept?
3. Does the assessment question gauge if the student was able to apply the concept to improve the performance of her experiment/model?

**Experiment Checklist**

1. Does the experiment directly explain the concept introduced above?
2. Does the experiment lend itself to redesign? The student should be able to improve the design repeatedly and learn more and more with each redesign.
3. Is the experiment unique? It shouldn’t be something that a classroom teacher does in his/her classroom and it shouldn’t be something that pops up quickly on simple google searches.
4. Is the experiment low-cost? It should cost less than $1 to implement with easily available materials.
5. The experiment should take you 20-30 minutes to implement (it shouldn’t be completely trivial)

**Family Science Screening Task**

To develop a recruiting and retention strategy for families

**Current Strategy**

We recruit primarily through schools, going through teachers and administrators. We present in classes, conduct mini hands-on sessions (led by engineering students) in schools, show videos at Back to School Nights to parents and pitch at parent meetings. During the actual Family Science Sessions, we provide dinner, the sessions are all free, participants get to take home their models and experiments. Sometimes they also get printouts that guide them on how to conduct further experiments at home.

We also run Engineering Design Challenges at partnering universities and invite schools to participate the semester before Family Science.

Our goal is to have 100-200 participants at each Family Science Session and to have more than 90% retention.

Currently, only 10-20% of our courses have 100 participants at a session and our retention rate is less than 40%.

**Vision**

We have done some aspects of the following, but not all together. The goal is to have all pieces in place so that we can provide the following experience for the families.

**The Family Science Experience**

- Iridescent banner at school (outside and inside)
- Warm greeting at the door
- Easy registration process (preferably electronic)
- Same volunteers should support a school so that the families are greeted by name
- Hold sessions in a big auditorium and make sure it is packed. Have 30-50 families in attendance.
- Have lots of volunteers and high-school students to support the families in exploration
- Provide really good food (instead of pizza) as a way to retain families!
- Translation should be a seamless and fluid part of the experience. It should be clear, accurate and delivered with high energy.
- Learning experience should be packed, multi-media rich and memorable. Relevant videos should be playing from the start so that no time is wasted and the audience is learning right away and is hooked!
- Engineers’ instruction should be clear, audible and delivered with high energy.
• Pictures and videos should be taken and immediately shared with all the participants so that they can download the multi-media and share with other friends and families. This has to happen immediately after a session, so that the attendance can increase from session to session
• Experiments should be unique, fun and relevant to the content. If a parent has more than one child, the parent should receive volunteer help.
• There should be no competitions or extrinsic motivators (like candy or prizes). We are advocating the “pleasure of finding things out”
• Wrap up reflection, video interviews and exit surveys should ALWAYS take place.
• Pre and post evaluation results should be shared with the families at the end of the course. Exit slip results should be collected, analyzed, graphed and shared with the families every week. Assessment should assist learning!
• Celebration of learning event at the end of the course where families can get together with the engineers, teachers, Iridescent staff and celebrate their learning!
• Tips, further instructions on experiments, resources should be shared every month after the course (through newsletters or parent programs). Share lesson plans, videos, links to kits, links to other programs in the community so that parents can continue supporting their child’s education
• Invite other STEM education programs to present to the parents
• There should be a very easy way for parents to give feedback about the sessions – at each session.
• We have to keep safety front and foremost as we scale. Experiments should be safe.

**Parent Info session**

• This session would be for parents. Children would be engaged separately (albeit in the same room) in an engineering design challenge
• Iridescent staff will share the vision for the program and how this is a long-term investment
• We could possibly ask the parents to sign a contract. Another possibility could be to charge $10 for the course as a way to ensure they will come back.
• Invite guest lecturer from local university to talk about engaging with children, asking questions, how not to tell children about the “correct” way to do things and really support exploration and discovery

Please answer the following questions:

• Building off of the current strategy, what would you do to increase recruiting and retention in each Family Science Course?
• How would you adapt the current model so that in 5 years we are reaching 100,000 participants at each site through Family Science Courses?

Email your responses to Tara@IridescentLearning.org

**HELPFUL HINTS**

• Please study our website to understand more about our philosophy and programs. You will find everything you need on the website (although it may take some digging)
• Feel free to ask us any questions.
• We would appreciate going the extra mile. Documentation with video and photos would be greatly admired!