ANNUAL REPORT 2019

acera

The Massachusetts School of Science, Creativity and Leadership

"Acera ignited my interest in neuroscience and psychology as well as software development. It's amazing how far you can carry yourself if you are truly interested in what you are doing. My thought processes have gone from sporadic and random to the beginning of something that has structure. I've been shown that I can say things, do things, and create things that are actually valuable."

— graduation speech from Acera student

LETTER FROM DIRECTOR & FOUNDER
COURTNEY DICKINSON

Dear Community,

We are celebrating the ten year mark of our school!

I write this sitting in the middle of our Commons. I hear conversation threads emerging from math classes – discussions about existentialism and universal quantifiers, as well as geoboard explorations marrying math and art. I see patient coaching by teachers helping kids engage in learning even when they struggle. I see kids move through the building not silenced or in lines, but instead skipping (literally!) and self managing, with twinkling lights and laughter spilling out of classrooms into shared collaboration spaces.

I founded Acera, consciously, as a microcosm of what could be possible for all schools and all students. Schools everywhere can be places where each child's capacities, needs, and interests are placed at the center of their educational experience. From the beginning it was my intention to take these approaches to learning beyond our walls. The 2018/19 school year marks the formalization of this effort to catalyze education innovation in public schools through AceraEI.

In the Lowell Public School district, a visit from their STEM Director grew into a commitment for a three year, whole school engagement with LPS' Pyne Arts K-8 Magnet School. The focus? Growth in students' science knowledge and skills, sure – but also growth in students' conceptual problem solving, creativity and divergent thinking, and self initiative. This effort is also focused on assuring students' well being and authentic engagement, as well as developing its teachers' use of innovative and evidence-based pedagogy.

2018/19 also saw the launch of our Life Science Change Agent Workshops – a series of free workshops to offer hands-on biology units to public school teachers, starting first with units in genetic engineering and microbiome. Already, workshop participants are implementing these innovative lab activities in their own classrooms, engaging a whole new generation of potential future scientists. We have found funding partners for this outreach work through life sciences organizations and educational philanthropists. We intend to show that these tools for effective education can be woven into all students' experiences.

This Annual Report focuses on the unique things we bring alive at Acera, and then shows how we are starting to bring these ideas and tools alive beyond our walls.

In the Commons, as students transitioned to lunch, I asked them to share some of the things they get to do and think about here that should occur everywhere. Here's what they told me:

"The kind of science we get to do here. The cool equipment and broad access."
"Coming up with lots of approaches to solve problems and ways to make things, not just one way that a teacher says is right."
"Being respected – trusted really – to define and do projects I care about."
"Learning the math that fits me, and not having to wait."

Each year I am moved by our students at graduation, these mini adults who, at 14, have already figured out things they love to ponder and do, who feel comfortable owning their deficits, and who feel brave to try new things for their future.

Kids can have a sense of purpose, authentic engagement, and develop a fearless ability to initiate and solve problems as part of their school experiences. As a result, they will be ready for a world that needs them as innovators, scientists and leaders. We are eager to grow our campaign and bring more of what is inside Acera outside to the world!

All the best,

Courtney Dickinson, Founder and Director

CATALYZING EDUCATION INNOVATION

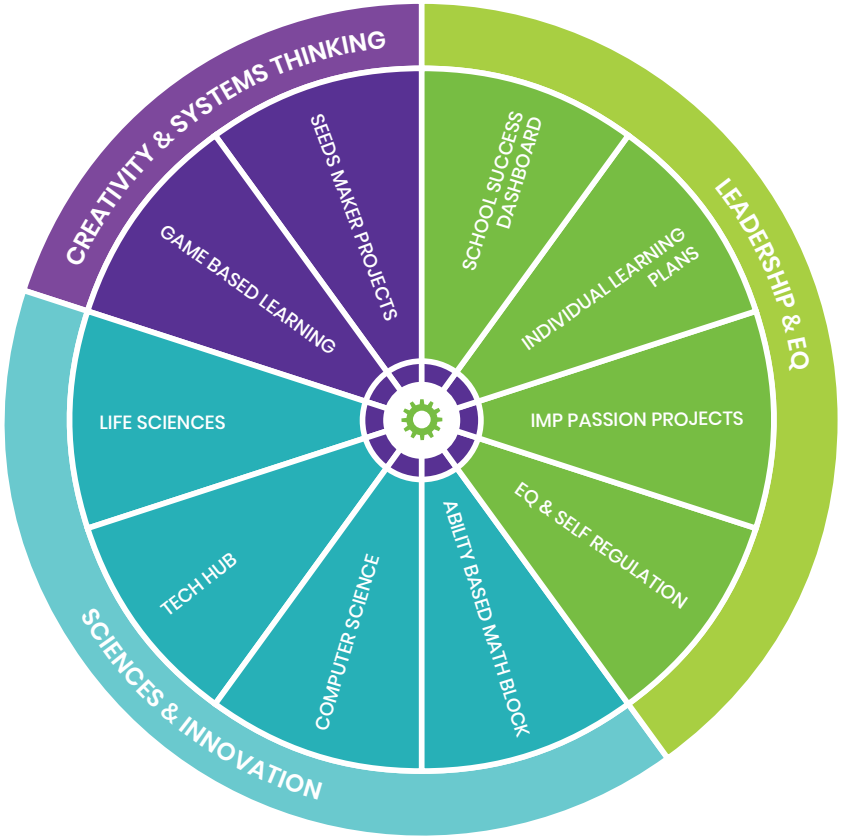
Transforming education in public schools, unlocking the next generation of scientists, innovators and leaders.

We believe that schools should catalyze students' passions, free their potential, and inspire a sense of purpose. We believe that early and deep exposure to STEM topics and creative, systems thinking capacity building are the keys to unlock students to be ready for current and future jobs and the challenges of our time. We believe that it is the responsibility of schools to safeguard each student's spirit, curiosity and innate love of learning, enabling them to be confident and fearless problem solvers and leaders for their communities.

At our K-9 STEAM school, we are proving that this works. Building on our 10-year history – during which we have invented, pilot tested, and put into use a wide range of curricula, pedagogy, and school norming approaches – we are bringing our "Tools to Transform Schools" to public schools and communities across Massachusetts. In the pages ahead, we share stories of how these tools manifest both at Acera and beyond. To learn more, or to contribute to our Priority Projects Angel Fund, contact aceraei@aceraschool.org.

The work of Acera School and AceraEI would not be possible without the partnership and support of our generous funders, public and community partners, and thought leaders over the last 10 years. In particular, we thank Saurabh and Richa Saha, who believed in AceraEI's mission to transform science education for all students and donated the initial investment in this effort.

10 Tools To Transform Schools



FUNDERS

- Amgen Foundation
- Anonymous
- Bristol-Myers Squibb
- Harvard University Institute for Quantitative Social Science / National Science Foundation
- Horne Family Foundation
- One Brave Idea, funded by the American Heart Association, Verily and AstraZeneca
- Saurabh and Richa Saha

PUBLIC SCHOOL AND COMMUNITY PARTNERS

- American Heart Association – STEM Goes Red (Boston)
- Boys & Girls Club of Greater Lowell
- Brilliant Labs of Atlantic Canada
- Cambridge Youth Programs
- 4H Clubs of Massachusetts
- KIPP Academy Lynn Collegiate High School and KIPP MA
- Lowell Public Schools
- Malden Public Library
- Teachers from the following school districts participated in AceraEI's Life Sciences Change Agent Teachers workshops:
  - Brockton High School
  - Career Academy High School, Lowell
  - Dartmouth High School
  - Gloucester High School
  - Greater Lowell Technical High School
  - Innovation Academy Charter School, Tyngsboro
  - John D. O'Bryant School of Mathematics and Science
  - KIPP Academy Lynn Collegiate High School
  - Lawrence High School
  - Littleton High School
  - Lowell High School
  - Masconomet Regional High School
  - Medford High School
  - Medford Vocational and Technical High School
  - Melrose High School
  - Minuteman Technical High School
  - New Liberty Innovation School of Salem
  - Peabody Veterans Memorial High School
  - Prospect Hill Academy Charter School
  - Salem Academy Charter School
  - Taconic High School

THOUGHT LEADERS

Eric Alm, Ph.D.
Founder, MIT Center for Microbiome Informatics and Therapeutics

Angela Belcher, Ph.D
The James Mason Crafts Professor of Biological Engineering and Materials Science at MIT

Peter Blake, Ed.D.
Assistant Professor of Psychology and Director of the Social Development and Learning Lab at Boston University

James Cleary, MD, Ph.D
Medical Oncologist at Dana-Farber Cancer Institute

The Dalai Lama Center for Ethics and Transformative Values at MIT

Mark J. Daly, Ph.D
Chief, Analytic and Translational Genetics Unit, Massachusetts General Hospital; member of the Broad Institute

Tami Lieberman
Assistant Professor, Institute for Medical Engineering and Science, MIT

Julie Legault and **Dr. Justin Pahara**
Amino Biolabs

Calum MacRae, MD, Ph.D
Vice Chair/Scientific Innovation, Brigham & Women's Hospital

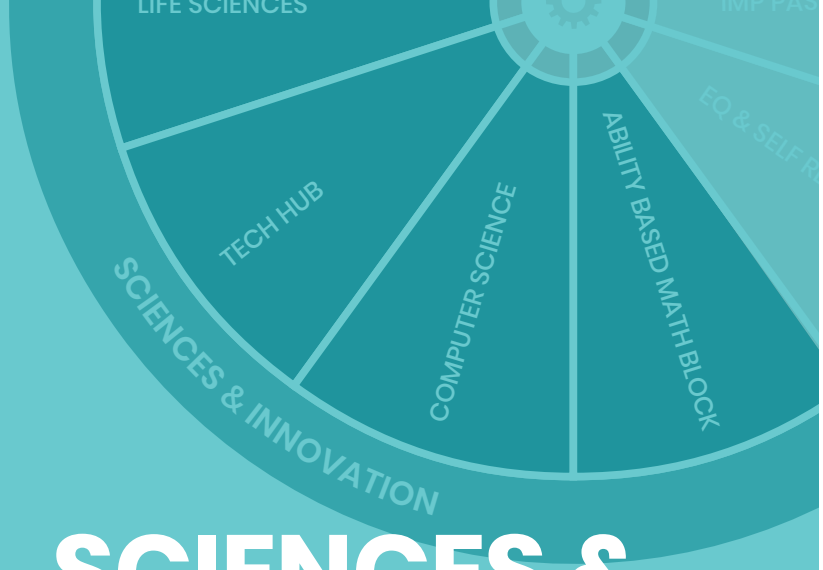
John Maloney
Lead Developer of Scratch, MIT Media Lab and Founder of GP

Novartis Community Exploration and Learning Lab

Latanya Sweeney, PhD
Professor of Government and Technology in Residence, Harvard University

Tufts Center for Engineering Education Outreach

Dr. Thomas Vandervelde
Associate Professor, Tufts School of Engineering



SCIENCES & INNOVATION

Students at Acera inquire deeply. They analyze and relate different components in a system, breaking things down and recombining them to assess a situation and address a need. Life sciences, technology, and math offer substantive, hands-on runways for kids to investigate real world issues and experiment with solutions. Along the way, students ask questions – and consider answers – in ethical decision making and weighing choices according to values and a sense of what is right.

RE-INVENTING LIFE SCIENCES EDUCATION

AT ACERA…

MIDDLE SCHOOLERS LEARN THEIR SKIN IS AN ECOSYSTEM

The results were fascinating. There was lawn growth and colony growth. *C. acnes* stood out over other bacteria as opaque dots of bright white against the blood agar plate. The number and diversity of microbes on the foot differed vastly from those on the forehead or elbow.

Students in Acera's life sciences lab were studying their skin microbiome, the thin film of microbes from multiple kingdoms that covers all living organisms. Recent evidence suggests that when a host is exposed to environmental cues, its microbiome responds first and then the host responds accordingly. This reveals an infinite number of connections between our physiology and our microbiome. Acera teamed up with MIT professor Tami Lieberman to turn this cutting edge research into a middle school lab activity in which students cultivate the bacteria from their forehead.

Students expanded the lab this year to study how the microbes that live on their faces differ from those on their feet and arms. The result? Kids learned that their skin is not a homogeneous environment; different parts of the body will select for different microbes, demonstrating that selection and adaptability are not just for forests and water systems. Students realized that the same underlying natural phenomenon and biodiversity that govern large landscapes are mirrored in small ones, expanding their understanding of ecosystems and forming connections between the experiment and the real world. Ongoing collaboration with Professor Lieberman, and the success of the class at Acera, led to the development of the second unit in AceraEI's portfolio to re-invent biology: The Human Microbiome.

...AND BEYOND

BRINGING CRISPR AND THE MICROBIOME TO MORE CLASSROOMS

It was June, and although school had recently ended, the learning continued. Leonardo Medina, a teacher at Lawrence High School, was captivated by AceraEI's free professional development workshops in gene editing and microbiomics, and anticipates his students will be excited about the new units.

"The activity and discussion about CRISPR generated many questions that did not have specific answers, and in many ways that replicates the way scientists work," he said. "It'll be very rewarding to see students buy in and engage themselves in the lab activity while they develop a scientist mindset."

Medina was one of about 25 local high school science teachers who came to Acera to edit genes using CRISPR and/or swab their own foreheads to culture their skin microbiome. The goal – deeply connected to AceraEI's mission to reinvent life sciences education – is for the teachers to bring these cutting edge curriculae to their own classrooms.

"As a science-driven organization, we are committed to investing in STEM programs to help pave the way for the next generation of scientists, who may one day be on the brink of their own ground-breaking discoveries."

– Saurabh Saha, senior vice president and global head of translational medicine at Bristol-Myers Squibb.

The three-day and two-day intensive workshops this summer were part of a series of trainings led this year by Michael Hirsch, Acera teacher and former biotech scientist. The curriculae – developed and pilot-tested at Acera – included hands-on experiments and guidance on how to answer commonly asked questions about the units. As a result of this training, more than 1,000 public school students will soon apply CRISPR to edit a gene or better understand their skin microbiome in their own high school science classrooms.

The workshops were funded through recent $50,000 grants from both the Amgen Foundation and Bristol-Myers Squibb. With additional funding, AceraEI will be able to offer ongoing support to implement the science labs and release new units which, cumulatively, can reinvent how high school biology is taught.

Gene editing and Microbiomics are two of nine units developed by Hirsch to reinvent high school biology. Future funding will support the expansion of our life sciences teacher trainings to include the full, year-long curricula, engaging students in cutting-edge biology and fostering the next generation of innovators and scientists.

The pace of progress in our understanding of biology is astonishing and has clear and direct implications to how our students learn the subject. Together we are inspiring the next generation to think big, ask challenging questions, and explore potential answers."

– Eduardo Cetlin, president of the Amgen Foundation.

FLEXIBLE THINKING AND COURAGE IN **MATH CLASS ... AND BEYOND**

What if math class was a place where kids' problem solving and deep thinking skills could come alive, and a place where they grow in their confidence and adaptability? Mathematics learning can be authentically engaging, and it is the perfect place for students to take on the much sought after "growth mindset." Rather than focusing on "getting the right answer," math class can be an incredible place to bring about flexible thinking skills.

At Acera, the school year starts with a series of math problem-solving exercises, offered up in an encouraging way with adults who observe and coach. These start of year math snapshots function as an assessment to place students in math classes based on student capabilities rather than their age.

Ability-based math classes become feasible through a scheduling framework of holding math classes at the same time across multiple classrooms and, ideally, multiple grades. Teachers can then define groups which fit the students' capabilities, placing students in the right level and right learning style/approach to best suit them in what they are ready to learn.

A key part of fluency is not just knowing a fact but also knowing how to think about solving a problem most efficiently, and picking the best strategy. Students get to engage deeply in a way that fits their capacity, and experience the authentic satisfaction which comes from trying hard, figuring things out, balancing that equation just right, and solving a problem. That kind of intellectual satisfaction creates an appetite for trying new and more challenging things. ***When habits of flexible thinking start to hatch, they can be generalized to other areas of learning and life.***

This was on display this year when students at Acera placed first in the state – and 15th worldwide – in the Middle School 1-400 Division of Purple Comet Math Meet, an event that drew more than 2,800 teams from 55 countries. In this meet, it's about how well the team can solve a problem together, not what kids have memorized. They get to practice teamwork, utilizing everyone's math skills and reaching a consensus on the answers.

In this type of math school schedule and framework, new possibilities open up for math experiences for all kids. These kinds of experiences then generate a new sense of self and new capabilities which far surpass math alone, and inform the adults they will become!

TECH HUB: SOLVING PROBLEMS IN SCHOOL AND BEYOND

Every week during Creativity Morning, Acera's Tech Hub buzzes with activity. The student members of the Tech Team take apart computers and smartphones, create their own electronic projects – such as a table-top cleaning robot that senses when it reaches the edge – and help repair technology equipment.

Acera's Tech Hub empowers students to emerge as community-minded technologists able to solve problems which benefit the whole school. This year, supported by Technology Specialist David Olson, the Tech Team branched out even further and took on other mechanical challenges, including fixing a broken water fountain and delving into the intricacies of bicycle maintenance and repair. Concurrently developing emotional intelligence skills and a wide array of technological abilities, Tech Hub members model and spread an attitude of fearlessness to use STEM tools for solving real problems.

Beyond Acera, we are making the case to public school districts that "Tech Hubs" can be implemented in schools easily, both as a philosophy and a place. It can start as simply as a cart in a cafeteria with one student fired up to be a knowledgeable, technically skillful community member ready to lend a hand to fellow students.

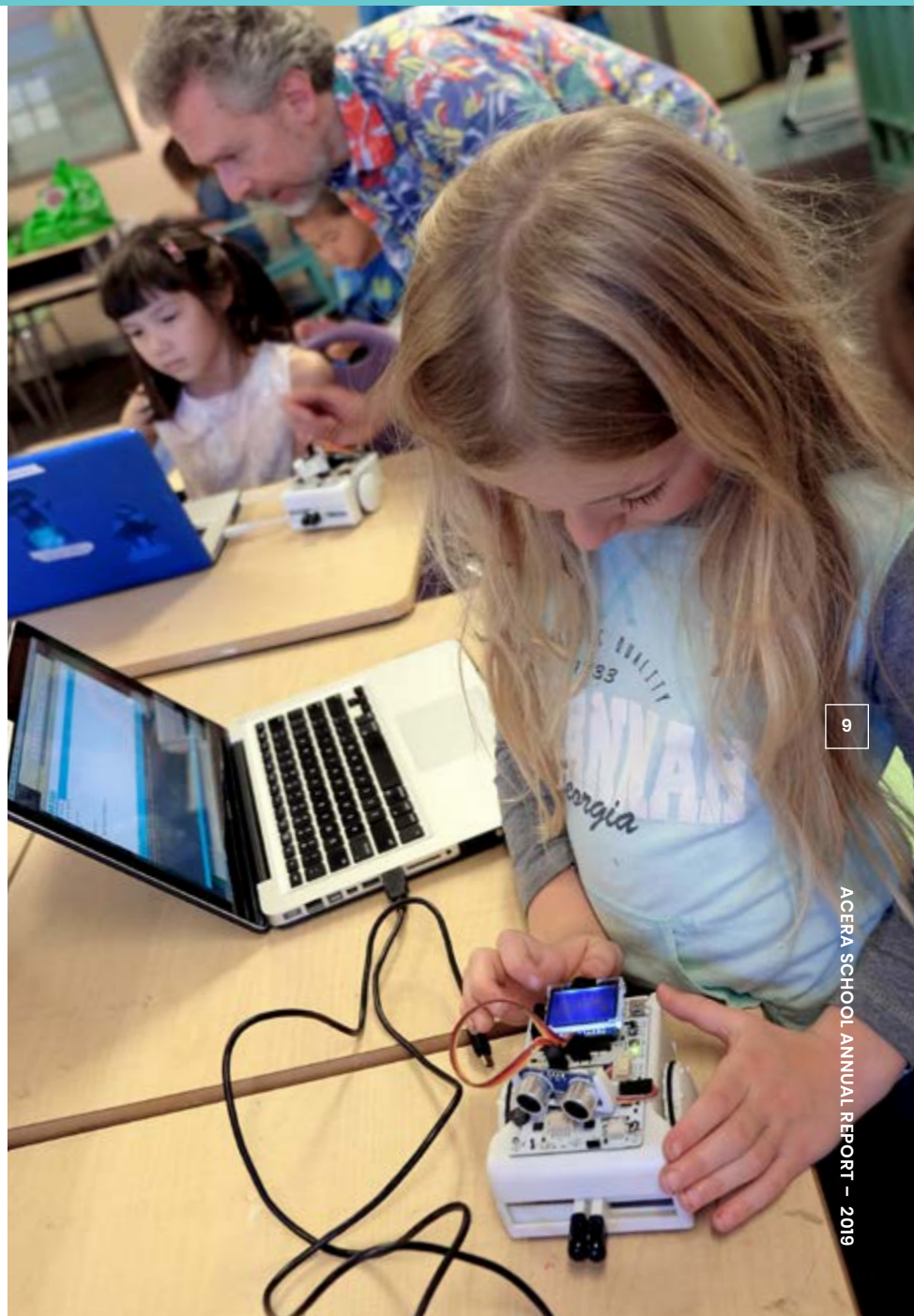
EXPLORING POWER AND PLAY THROUGH COMPUTER SCIENCE

Small children can understand big ideas, and computer science is no exception. Acera's hands-on curriculum introduces students to computer science concepts beginning in early elementary.

Building on the year-long theme of power, kids in Danny Fain's Powerful and Purposeful Programming elective sought answers to questions like: What kinds of power can be exerted or expressed by digital products? How could those forms of power be responsibly designed to consider the real-world effects? How might digital play also serve a meaningful purpose? In small teams, students explored those questions by using programming tools to create and remix digital products like apps, games, and websites.

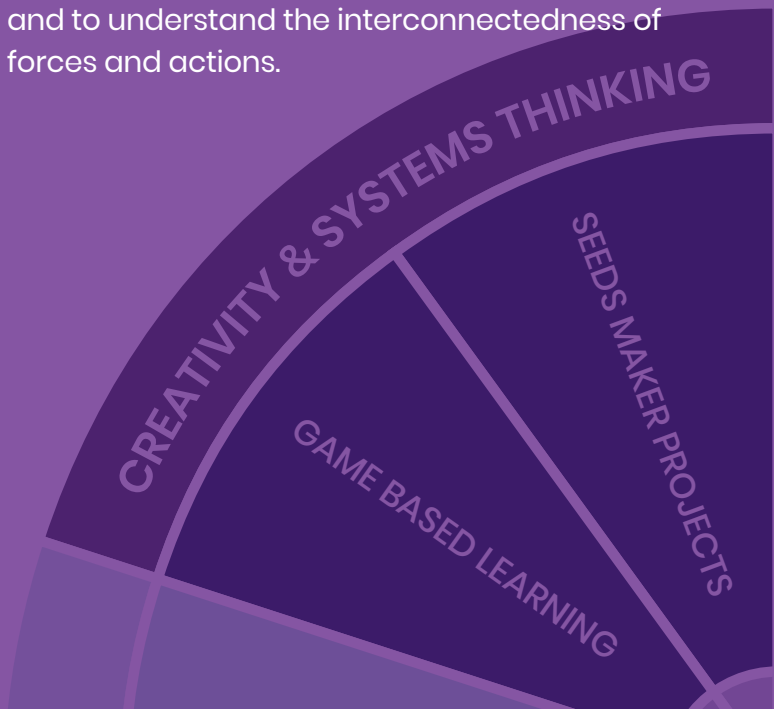
In another elective, Designing Learning Experiences, the students became the teachers! Technology and Narrative Specialist David Alsdorf asked students to design, implement, and assess creative learning opportunities through a study of the history of child-centered play and maker based pedagogies, including Froebel, constructionism, and LEGO. They then designed a new learning experience and facilitated it with other students, practicing leadership, play and community with metacognitive computer science education.

These are just two examples of the many creative ways computational thinking and technical fluency can be developed throughout K-12 education. Pilot-tested and ready to translate for adoption by public schools, these computer science learning approaches help students become facile and fearless.



CREATIVITY & SYSTEMS THINKING

At Acera, students utilize free thought and inquiry, resulting in original work or novel approaches for expressing an idea or solving a problem. We encourage kids to see the whole picture and its parts across social, cultural, societal, scientific, and historical perspectives, and to understand the interconnectedness of forces and actions.



SEEDS MAKER PROJECTS

AT ACERA...

IN "CHOREOGRAPHY OF MATTER," STUDENTS CREATE A PERFORMANCE OF MATERIAL SCIENCE

The cluster of girls ran from the Innovation Lab to the playground, entering the bright sunshine. The handmade purse held by one of the students instantly turned from vivid pink to sky blue, causing a chorus of "that's so cool!" from the group.

The color-changing purse was the idea of Anna, a student in Acera's "Choreography of Matter" SEEDS elective. She brought it to life through experiments in how photochromic pigment interacts with fabric paint and artificial leather.

Alisha Collins, SEEDS program manager and research practitioner, designed the unit to enable students to explore how different materials interact with each other. Kids created "leather" from kombucha, broke down the bonds between fructose and glucose to make hand-pulled candy, and experimented with the natural dye properties of foods like turmeric and berries during the

elective. Students were also empowered to pursue their own questions and ideas, and use what they discovered to create something unique and meaningful to them. The results were diverse and fascinating, functional and beautiful, ranging from a lamp made from silkworm thread to a glow in the dark model waterfall created from resin.

"Just as a good choreographer understands and brings out the best in each artist to create a performance, the students in this course looked at the properties of materials, identified their hidden talents and the ways they work together, and created their own performance," said Collins.

Lowell Public School teachers participate in a two-day workshop, preparing to implement "Enchanted Electronics" at their K-8 school.

"For my project, I wanted to see what resin would soak up when it was still liquid, and what it would look like when it hardened. I used natural moss, and found that the moss soaked up a lot of the resin and molded to the shape of the bowl. This gave me the idea to make a miniature waterfall by adding glow-in-the-dark rocks and create a waterfall effect with more resin. I'm really happy with it!"

– Melyna, Acera student

...AND BEYOND

SEEDS' "TEACHING BY TINKERING" TAKES OFF IN LOWELL...CATALYZING INNOVATION IN PUBLIC EDUCATION

The gymnasium was buzzing with the sounds of conversation and laughter as teachers proudly showed off their creations to their peers. Across a series of tables, dozens of "hacked" toys were on display: stuffed animals sported new flashing lights in their ears or bellies, and plastic flowers glowed with LEDs powered through miniature circuits.

At this SEEDS professional development workshop, more than 50 teachers from the Joseph G. Pyne Arts Magnet School (Lowell Public Schools district) spent an afternoon with Alisha Collins for a lesson in hacking toys, an activity that combines the parts of an electronic toy with a non-tech toy in order to make something new. The goal? To bring hands-on, creative, and STEM-infused curriculum to thousands of Lowell kids.

This workshop was the first in a series as part of a three-year partnership between AceraEI, the Pyne Arts School and the Lowell Public Schools District to unlock creativity, student initiative, and STEM capacity in Lowell. Year One of this partnership is funded through a generous anonymous donor.

Short for "Science, Engineering, Esthetics, Design, and Storytelling," SEEDS is a maker space that merges STEM concepts like chemistry, circuitry, and programming with arts and crafts activities. A hallmark of SEEDS is its use of low-cost tools and materials to help students bring their ideas to life through creative making and design, something that appeals to budget-conscious school districts.

Featuring curricula like Enchanted Electronics, Choreography of Matter, and Designing for Health, SEEDS is gaining momentum as a professional development series, as well as a novel approach to engaging more girls in STEM. In addition to leading several workshops with Lowell teachers this year, Collins has brought her maker education units to the International Society for Technology in Education (ISTE) and Learning and the Brain conferences, as well as to 140 girls in Boston Public School through the American Heart Association's STEM Goes Red Boston event.

AceraEI seeks donors to fund continuation of these and other projects, which catalyze innovation in public education.

"I love science and am excited about learning new ways to infuse these hands-on lessons into our classes. I look forward to our next session of learning. Thank you!"

– Lori Lang, Assistant Principal, Pyne Arts faculty

GAME-BASED LEARNING

AT ACERA…

ACERA STUDENTS TEACH PEERS HISTORY THROUGH GAMES

The year is 44 BC. At the height of the conspiracies against Caesar, six Roman senators are navigating the political landscape to advance their own interests.

No, this isn't the set of a movie; it's the premise of "Hail Caesar?" – a game conceived and created in javascript by students in Acera's middle school elective class, "Powerfully Playful Programming."

Recognizing that the life and times of Julius Caesar may seem distant or inaccessible to students, these middle schoolers designed the multiplayer game to help this era of history come alive. Up to six players take on the roles of senators, each tasked with their own unique goals to complete. In addition to better understanding world history, "Hail Caesar?" players practice skills such as systems thinking, perspective taking, problem solving, and collaboration.

Acera students presented the game at LearnLaunch Institute's 2019 Learning Innovation Showcase in Boston; the group was one of just 23 middle and high schools from across New England selected to appear. The event is part of an annual national conference where educators, entrepreneurs, investors, and policymakers can see a range of edtech tools applied in real learning environments.

...AND BEYOND

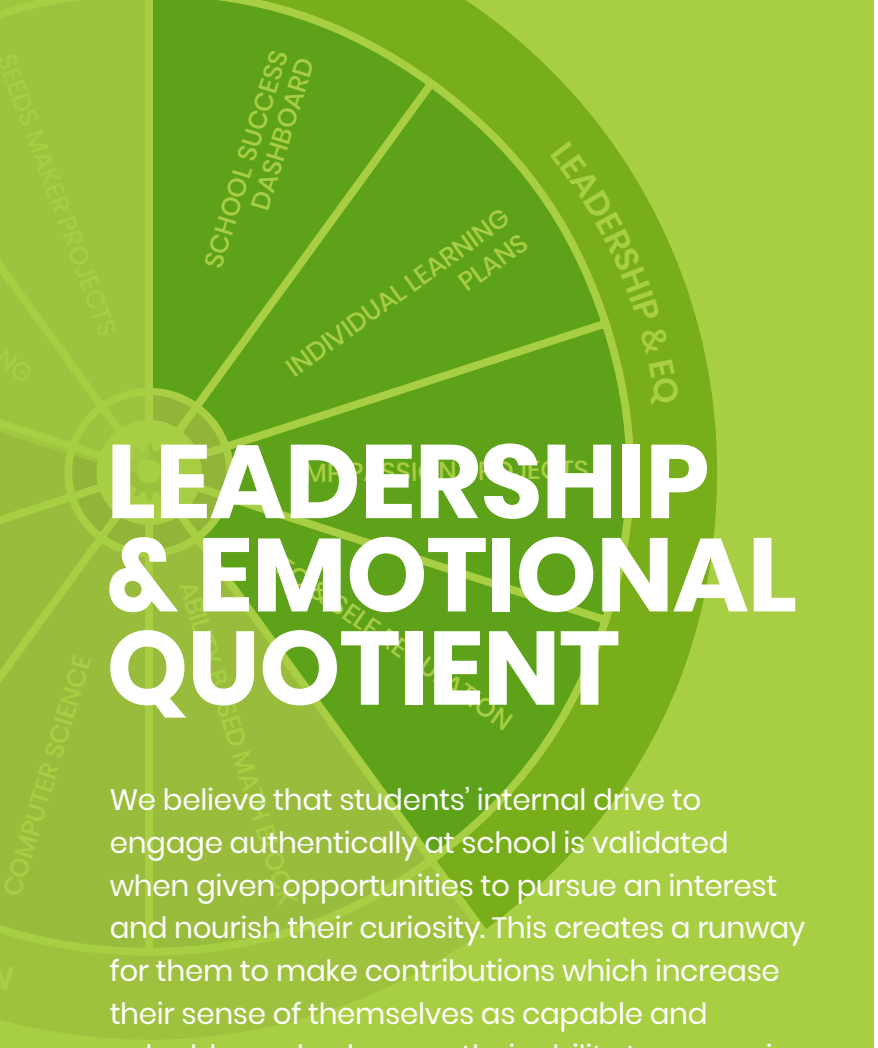
"PLAYING" WITH THE FUTURE: TEACHING SUSTAINABILITY THROUGH GAMES

Games are an incredible way to develop systems thinking, perspective taking, problem-solving and collaboration skills, which can help mold a generation that sees the forest, not just the trees. Out of a desire to teach social and economic cooperation, Acera Core Classroom Teacher and Teacher Mentor Kim Machnik designed "Minali," a game in which the cooperative and competitive elements increase in complexity and challenge as students succeed in sustainable ecosystem and economy management.

Since the fall of 2016, students from Ms. Kim's class have worked with Peter Blake of the Boston University Social Development and Learning Lab to design, test, and implement a human behavior study based upon a simplified version of Minali that tasks players with harvesting fish from a shared lake.

This year, students took the game – and the study – outside Acera's classrooms for the first time. They engaged with kids at Boys and Girls Clubs and 4-H Clubs in Greater Boston, and gained insight into their perspectives on what fairness looks like around a shared resource.

Ultimately, the goal of this research is to publish a paper on the behavior of children in a system containing limited resources and competing actors. The students' boldness, curiosity, and compassion for people and the planet have carried them to new heights of wonder and insight. They are motivated to understand the way people think, and to contribute to the collective wisdom of humanity on a topic they see as mission critical for the future they envision.



LEADERSHIP & EMOTIONAL QUOTIENT

We believe that students' internal drive to engage authentically at school is validated when given opportunities to pursue an interest and nourish their curiosity. This creates a runway for them to make contributions which increase their sense of themselves as capable and valuable, and enhances their ability to recognize their gifts and challenges. Ultimately, kids are empowered to identify a need, realize a vision for change, and combine the contributions of others to bring it to life.

LEARNING WITH JOY AND PURPOSE THROUGH **PASSION PROJECTS**

AT ACERA...

The aquarium tank rested on a table in the Innovation Lab. Several inches of water – tinged slightly brown from the nutrients – rippled gently inside as tubing drew it upwards. Above the tank, microgreens sprouted from holes carved into a PVC pipe, their roots nourished by the system's flow.

The creator of this hydroponic system, middle school student Emil A., explained to parents, teachers, and students how his system would grow organic plants faster, and use less water, than a traditional soil garden.

The event was a symposium for students to share the status of their Passion Projects. The student-led work spanned a variety of subject areas. Some wrote novels about outer space and a summer camp set in England. Others designed and constructed motorized scooters or life-size Strandbeests in woodshop. Some conceptualized and programmed computer games using Python and Scratch, while others immersed themselves in life sciences experiments, using CRISPR to modify *E.coli* genomes.

Acera features Passion Projects as part of its middle school program. Every week, middle school students have blocks of time to design, create, problem solve, and iterate on a project of their choosing, while concurrently learning project management skills. Specialist mentors are available to advise on independent projects.

"Passion Projects are a way for students to engage deeply in something they've picked, and to inquire, research, and make something real – something that can even have real-world impact," said Courtney Dickinson, founder and director of Acera. "This fosters a sense of purpose and taps their intrinsic motivation, because they are bringing alive something that's important to them."

The result? Students want to come to school. With additional funding, AceraEI can partner with public schools experiencing chronic absenteeism to build Passion Projects into their programming. This sense of purpose can set the stage for kids to not only show up to school, but also be productive and engaged citizens in their future.

"For my project, I created wearable robotic wolf ears. They are attached to a headband, and you can move them to show different wolf emotions. The ears are controlled by Circuit Playground Express, a programming medium that can be controlled using Java or a block-based method similar to Scratch. I chose this project because of my interest in the natural world and the animals in it, particularly wolves, and their ways of communication."

–Simone B.

...AND BEYOND

A PASSION (PROJECT) FOR THE PLANET

It was a Thursday evening in May, and Acera was open and bustling. On one table, people clicked on iPads that provided details on the "Green New Deal." On another, postcards and stamps beckoned participants to write to their representatives and senators. In rooms around the school, small groups brainstormed on answers to questions posed to them. The topic? What we, as a community, can do together to fight climate change.

The creator and host of this public event was fifth-grader Malia S. Inspired by watching a documentary on the impact of the palm oil industry on the rainforests of Borneo, Malia organized a "Night of Action" for her fellow classmates and parents to watch the movie and discuss ways to help the planet. From there, her research led her to the Sunrise Movement, a coalition of youth uniting to stop the climate crisis. Its website suggested ways for students to take action, and Malia liked the idea of organizing a Town Hall. Malia knew she wanted a guest speaker involved in policy. With support from her teacher and project mentor Kim Machnik, Malia phoned the offices of U.S. Senator Edward Markey and Massachusetts State Senator Jason Lewis. While neither lawmaker was able to attend, the experience of contacting policymakers was an empowering one, and Malia took on the roles of facilitator and lead speaker herself. She also made the decision to open the event beyond the Acera community to the general public, drafting and submitting press releases to area newspapers and securing several news stories.

The project, and her passion for it, is far from over. She plans to take the ideas generated at the Town Hall meeting to further her efforts on climate change in the coming school year. Perhaps we'll see her name authoring legislation in the future!

"I decided to act now because I know there isn't time to wait for when I'm an adult. Next year I plan to keep working on climate change!"

–Malia S.

SCHOOL SUCCESS: **MEASURING WHAT MATTERS**

WHAT MAKES A SCHOOL SUCCESSFUL?

One of the challenges with education is that we are not measuring the things that matter the most. The decades-long standardized testing movement has failed to close the equity gap in education, which was its entire intent. So, where does that leave us?

We have an opportunity to *redefine* the purpose of school, and concurrently step back as a society and look at what we are doing to our children. Many common school practices are actually harmful to kids: inducing anxiety, creating a culture in which kids feel anonymous or silenced, and rewarding compliance over setting the stage for students to engage in authentic problem solving challenges.

Here's where this "redefining" can begin –
*with a comprehensive dashboard for success that measures **four** categories:*

1

Growth in students' core capacities: Systems thinking, problem-solving, creativity, ethical decision making, emotional intelligence and adaptability, initiative and leadership, perspective taking and collaboration.

2

Positive school cultures and overall student well being: Positive supportive relationships between students and adults, reduction in anxiety and depression levels, authentic engagement in learning, and students' sense that the work they are doing is meaningful and relevant. Schools can foster a positive school culture that gives kids "permission to fail," rewarding the practice of taking a chance and trying something new, even if it doesn't work out as planned.

3

Evidence based pedagogy: Put into place learning approaches that are backed by evidence. For example, include learning experiences crafted around students' curiosity, like passion projects. Reduce reliance on "chalk talk" lecture/listen learning, and increase project-based learning.

4

Standardized testing & absences: There are ways to improve the types of standardized tests which are emphasized, and extinguish those that incent a "teach to the test" approach. Content acquisition and rapid coverage of topics can, on the surface, seem effective, but learning psychology tells us that only when knowledge is analyzed, applied in new ways, and truly internalized and used does that knowledge "stick" rather than being forgotten as soon as the test is over.

Our kids are genuine, they are growing, they have learned, they understand themselves better than when they came here. We are incredibly grateful to Courtney, the most courageous person in the world, for creating this place!

– Joanna Cutts, Acera parent


Panda

AT ACERA…

We start every year with non-stressful qualitative assessments to get a snapshot of where kids are in September – in reading, math, emotional intelligence and perspective taking, conceptual and complex thinking skills, awareness of others and collaboration – and then, along with parental listening conferences in September, core classroom teachers develop an individual learning plan and pathway which is uniquely suited to each child's current readiness, learning profile, needs, and interests.

Beyond our school, we have set the stage to bring this educational approach to Pyne Arts K-8 School in Lowell, through a customized School Success Dashboard which fits their priorities for student growth and school improvement. The fall of 2019 officially launches a three year whole school engagement with this school, to bring these capacities and orientation alive in new ways, and support application of our Tools to Transform Schools into this urban K-8 program.

We can improve our schools and our kids' educational and childhood experiences. There are myriad ways to do this, and teachers know how. We simply need to get outdated norms and habit out of their way, and set new goals for schools.

...AND BEYOND

Wendy Crocker-Roberge describes her first visit to Acera School as "a paradigm shift." The principal of Pyne Arts K-8 Magnet School in Lowell was struck by the sense of autonomy, creativity, and purpose she found across all classrooms.

"The first thing I noticed was how independently engaged the students were; everyone was intently busy, and there was so much purpose to it," she said. "I couldn't get this place out of my head. I knew right away that there were principles of this learning that belonged in public schools."

Inspired by AceraEI's mission to transform public schools, Roberge and members of her faculty met with AceraEI's team to brainstorm ways to bring Acera's curriculum and approach to K-8 education into Pyne Arts classrooms.

Now, through the support of an anonymous donor, AceraEI and Pyne Arts are embarking on a three year, whole school engagement project. This school transformation effort is designed around Pyne Arts' needs and goals, and will set the stage for growth in student's conceptual problem solving skills, creativity, and initiative.

The multi-year project includes implementation of a School Success Dashboard, which will measure not only standard achievement, but also student core capacities, evidence-based learning approaches, and overall student wellbeing within a positive school culture. Through this whole-school approach, students will become confident, creative, systems thinkers who are the best version of themselves, in a 21st century world – adaptable, purpose-filled, and fearless.

"There have been few times in my career when we get together with a team of people and there's synergy. In every meeting I've ever had with Acera, there's been this synergetic feel."

– Wendy Crocker-Roberge, principal, Pyne Arts K-8 Magnet School, Lowell

LEARNING THROUGH **PROJECTS AND AUTHENTIC INQUIRY**

Project-based learning is an integral part of the experience of an Acera student. It is woven into the school's focus on voice, choice, and development of core capacities, manifesting in classroom explorations and individually designed initiatives. Through year-long themes and guiding questions, students and teachers work together to chart a path for learning. As students develop and deepen their understanding they are given the latitude to revisit and revise project outcomes, allowing what they learn to help inform where they go next.

To begin any individual or group project, students first connect their inquiry to a real life question or problem. Through research, consultation with experts, and an iterative design cycle, they begin to both build their understanding and move towards an outcome, where the culmination of their learning is shared through the development of an authentic solution, product, or showcase.

ELEMENTARY STUDENTS EXPLORE ANTARCTICA

How can scientists tell so much about the climate from a sample of the sea floor? If Antarctica isn't a country, are they any laws? Who makes them? These were some of the questions asked and explored in Ms. Elena's multi-age (grades 2 & 3) classroom, where students were visited early in the school year by Ruthie Halberstadt, a geoscience Ph.D. candidate from UMass Amherst.

Halberstadt led the elementary school students in a discussion about the importance of Antarctica as an international research station, the species that live there, and the science-based activities – including mapping the seafloor and studying sediment cores – that she will conduct on her 2019 expedition to the continent.

Using her visit as a catalyst for inquiry, students and Ms. Elena integrated the topics they discussed into their learning throughout the year: climate science, geoscience, natural history, physics, statistics, biology, and international relations. The kids made their own stratigraphy – using components like sand, rice, and pebbles to represent different layers of sediment – designed and built models of Halberstadt's research vessel, JOIDES Resolution, and used what they learned to create their own public service announcement on climate change. As the school year ended, Halberstadt returned to Acera to share photos from her trip, show the kids a real ocean floor drill bit, and be stumped by the "what species am I?" riddles they wrote.

For the students, Halberstadt was more than a guest; she was a role model using science to make a difference in a meaningful way. And for the girls in the classroom, Halberstadt's visits were a valuable opportunity to meet and talk to a woman working as a scientist in the real world.

MIDDLE SCHOOL STUDENTS BRING A MODULAR CLASSROOM TO LIFE

The excitement and pride was palpable as students, teachers, and parents gathered on a sunny morning in June. Behind them, brightly colored ribbons – awaiting the ceremonial cutting – surrounded a geometric wooden structure adjacent to the playground. They had come to celebrate the culmination of a year-long middle school architecture elective, during which students sought to answer the question: how can we embody the spirit of Acera in a structure?

Mentored by architecture teacher Esteé Hill and woodshop teacher Marie Delaney, the kids actively engaged in teams on design, prototyping, permitting, and construction. Reflecting the real world of building design and creation, the project included a trip to meet and present plans to Winchester Building Commissioner John Wile.

To kick off the design thinking process, students asked each other questions like "what are essential elements of architecture?" and "what makes Acera unique?"

"One of the things we thought of – especially with Acera's Innovative Lab – was that it's a changing space, it's dynamic," said student Moe F. "So we started off by designing things that could be modular in different ways, and could change to adapt to different needs."

The final prototype was an octagonal small-group classroom, with walls that slide on a student-made pulley system to convert into tables while bringing in fresh air and sunshine. In the spirit of inclusion that is pervasive at Acera, the team invited all elementary and middle school classes to paint a wooden seat in a way that tells the unique story of their classroom.

For team members like Julia S., seeing their hard work come to life has been a memorable and satisfying experience.

"It's been really cool to see this built and real," she said.

As we grow, we look forward to bringing project-based learning outside of Acera and into public schools everywhere!

GUESTS @ACERA

1. Venerable Tenzin Priyadarshi of The Dalai Lama Center for Ethics at MIT.
2. Acera's Michael Hirsch visits KIPP Lynn Academy as students run his gene editing with CRISPR activity.
3. Guests from LEGO Foundation and LEGO Ideas Studio
4. State Representative Paul Brodeur takes a tour of Tech Hub.
5. Acera Student Katherine Rosenorn accepts a Model UN Best Delegate award.
6. Acera students participate in Scratch Day at MIT.
7. Lowell biology teacher Bernice Chandler-Petrovick unpacks gene editing lab kits for Lowell students.
8. Acera's Alisha Collins at STEM Goes Red Boston.
9. Ms. Elena's class welcomes geoscientist Ruthie Halberstadt back from Antarctica.
10. Acera students show their tiny house plans to Winchester Building Commissioner John Wile.
11. Nobel Laureate Sir Fraser Stoddart visits Acera.
12. Courtney Dickinson is a guest on "Simulation Series" with host Allen Saakyan.

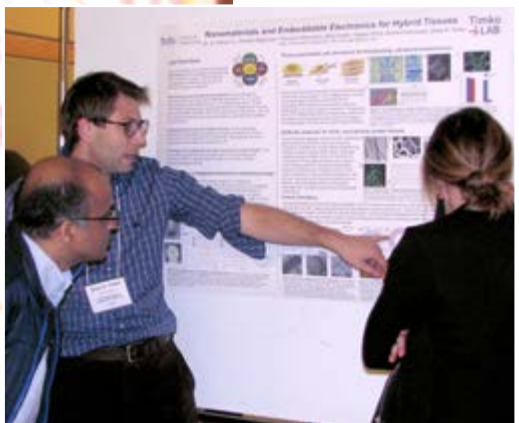
ACERA'S INNOVATOR SYMPOSIUM

Can you grow steak in a lab? What do we know about the earliest stages of cardiovascular disease? Can you program a chatbot to be HIPAA-compliant? These are the questions being asked in labs right in our backyard in Greater Boston. Acera's annual Innovator Symposium is a free community event that showcases scientists and inventors – and their groundbreaking work – for people of all ages to enjoy. Each October, hundreds of kids, adults, researchers, and tinkerers attend to explore the worlds of neuroscience, nanomaterials, 3D printable clothing, and wearable biometric technology.

There are no assumptions about what content is "too old" or "too young" for attendees at this unique and interactive event. Children and adults alike enjoyed conversations with leading scientists on the future of autonomous aircraft, discovered what a hospital patient's room could look like in 2020, and viewed skin microbiomes under a microscope in Acera's hands-on life sciences lab. It's one of the many ways Acera makes science accessible to all ages and learning styles, and makes connections to innovations happening in the real world.

SPEAKERS AND PRESENTERS, OCTOBER 2019:

Aurora Flight Sciences, makers of advanced unmanned aerospace vehicles
Backyard Brains, Neuroscience for Everyone
Bray Lab at Tufts Department of Mechanical Engineering
Coasts and Communities Fellowship Program at UMass Boston
GRIT, engineers of all-terrain wheelchairs
Harvard Global Health Institute
MC10, makers of wearable devices for biometrics monitoring
Ministry of Supply, creator of NASA-inspired business clothing
The Nanobiointerfaces Lab at UMass Boston
One Brave Idea, a multi-disciplinary collaboration to understand the earliest stages of heart disease
Orbita, makers of HIPAA-compliant voice and chatbot technology for healthcare
Philips Design, Collaborative design for improving patient care and experience
School of Graduate Biomedical Studies at Tufts University
Timko Lab at Tufts Department of Biomedical Engineering
Waterfield Design Group, designer of playgrounds in post-earthquake Haiti



The Reed Hollett Enrichment Scholarship Fund

In addition to Acera's other fundraising campaigns, the school raises money throughout the year for the Reed Hollett Enrichment Scholarship Fund. Acera School established the Fund in 2016 to provide scholarships for low-income students to participate in Acera's after school and summer enrichment programs. The Fund honors the memory of Reed Hollett, a beloved Acera teacher who passed away unexpectedly in 2015. Reed believed passionately in the importance of getting children outdoors to experience nature; he led the Outing Club and the Construction Corner in Acera's after school programs. Reed was a person of life and light who had an incredibly pervasive presence throughout our community. He engaged each student as an individual and had a special, rare gift for truly seeing and knowing the person within.

ACERA STAFF*

Courtney Dickinson, Founder & Director
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A.B., Reed College

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M.S., Wheelock College
B.A., Swarthmore College

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B.S. and B.A., University of Notre Dame

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B.A., University of Massachusetts at Amherst

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B.A., Birmingham-Southern College

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M.Ed., Lesley University
B.A., Smith College

Joshua Schuler, Director of Partnerships and Outreach
M.B.A., Collège des Ingénieurs
S.M., Massachusetts Institute of Technology
B.A. & B.S. Tufts University

*Full-time Acera Staff for 2018-2019 school year. Additional part-time staff include math, computer science, creativity morning, and woodshop teachers.

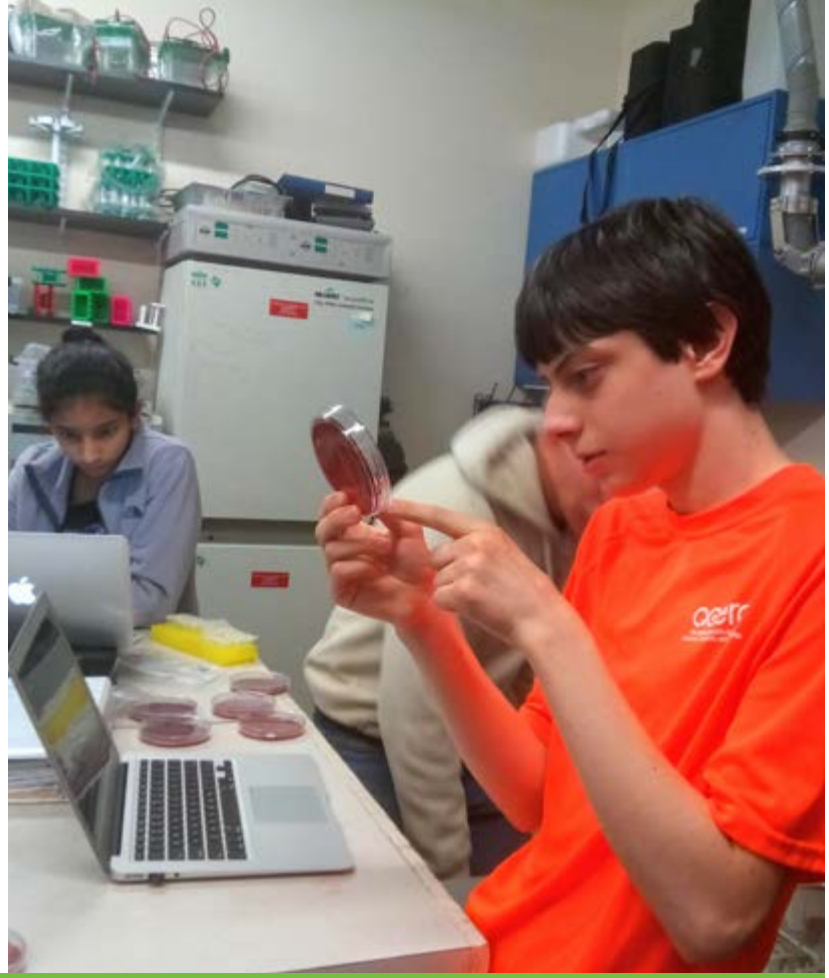
Debbie Seidell, M.S., Math Specialist & Coordinator
B.A., Brown University
M.S., University of Washington

Katie Semine, M.Ed., Core Classroom Teacher
M.Ed., Tufts University
B.A.,Tufts University

Kara Williams, M.A., School Counselor
M.A., School Counseling, University of Saint Joseph
B.A., Eastern Connecticut University

Sandra Zuckerman, Director of Admissions
B.A., University of Colorado
Professional Diploma, Berklee College of Music

Sarah Zuckerman, M.Ed., Director of Faculty
M.Ed., Harvard University Graduate School of Education
B.A., Indiana University



"Courtney is incredible, her vision for this school is awesome, and she has put together an amazing team of brilliant, friendly, down-to-earth, and caring people to make that vision a reality."

— Franklin Shearer, parent

BOARD OF DIRECTORS

Acera's Board of Directors has as its foremost charter to safeguard the fiscal stability and sustainability of the school. Its approach is modeled more after the for-profit sector than the typical non-profit board approach, enabling the rapid and flexible growth of a start-up school.

Courtney Dickinson, B.A., CHAIR
Founder & Director, Acera School

Michael K. Barron, J.D., SECRETARY
Partner, Morgan Lewis

Richard J. Morello, M.B.A., TREASURER
President, Life Sciences Division, Aptus Health

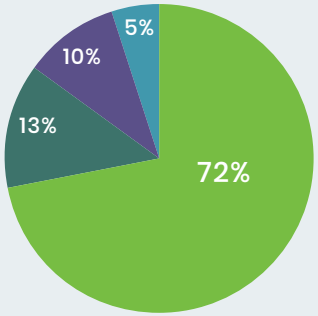
David Grayzel, M.D.
Partner, Atlas Venture

Greg Phelps, M.B.A
Independent Advisor; Former Chairman of the Board, Charles River School

Holly Whittemore, C.P.A.
Head of Finance, Nimbus Discovery

ACERA SCHOOL **FINANCIALS 2018–2019**

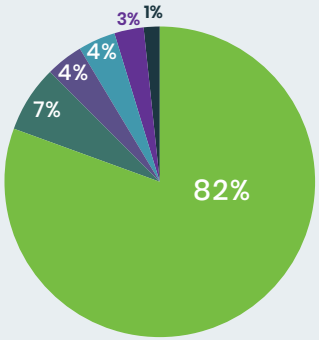
Since its beginnings in 2010, Acera has been a bootstrap start-up that provides an exceptional educational experience for all students. Tuition accounts for approximately 80% of the targeted budget; the remainder of the operating budget is raised each year through generous donations from our families, friends, and funders and through our STEAM Learning Lab enrichment programs throughout the year. We are actively building our network of academic institutes, corporations, collaborators, and foundations, enabling expansion of our Innovation in Education mission.



INCOME

Gross School Tuition	$3,072,300
Other Revenue (donations and institute partnerships*)	550,202
Summer Camp Enrichment	$451,286
After School and Vacation Camp Enrichment	196,512
	$4,270,300

*AceraEI's public school partnerships are not funded through Gross School Tuition



EXPENSES

Salaries, Benefits & Taxes	$3,458,602
G&A	279,513
Classroom Expenses	167,500
Facilities	146,450
Depreciation	122,400
Education Innovation	52,000
	$3,226,548

"I have been hugely impressed with the electives program: both the variety of options and the strength of those options. I hope this program continues – and even grows! It's truly special, and kids have also enjoyed it tremendously.

— **Lucy Lubashev, Acera parent**

If you are interested in becoming a curriculum collaborator or would like more information on investing in Acera's work in education, please contact:

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