ANNUAL REPORT

2017

acera

The Massachusetts School of Science, Creativity and Leadership

LETTER FROM DIRECTOR & FOUNDER
COURTNEY DICKINSON

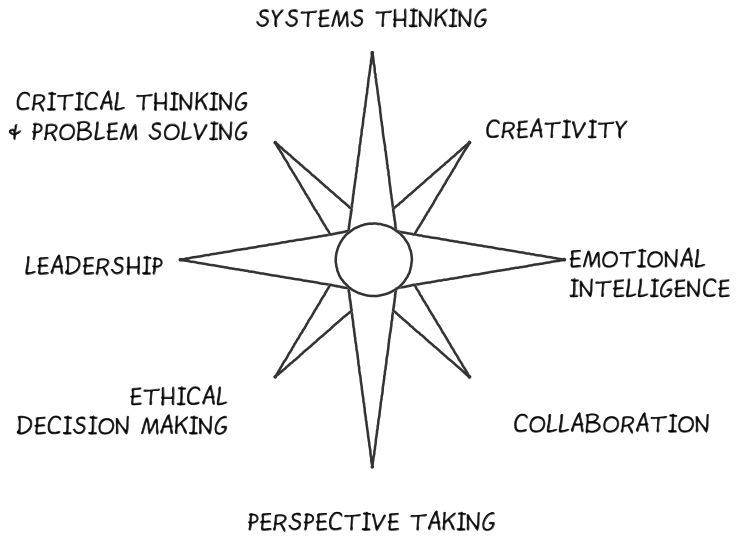
At Acera, we believe in deep, authentic learning where students engage because of their intrinsic motivation, explore the world in new ways, and solve challenges with creativity!

In 2017, we grew to 125 students, added key new teaching expertise and programs, and continued our efforts to become a sustainable organization. As a bootstrap start-up launched with a wealth of vision but no money, we have blossomed through raw persistence and an urgency to create a beacon for innovation in education everywhere!

Nearly four years ago we migrated to our permanent home at 5 Lowell Avenue with open spaces for collaboration and hands-on, project-based learning in a STEM-rich environment. This year we have dramatically augmented our programs with the SEEDS Design Studio and Tech Hub, and a myriad of creative, after-school enrichment and summer programs. These exciting new offerings not only bolster our one-of-a-kind K-8 STEM environment, they are also available to the general public.

In addition, our team led conferences and workshops for public school teachers and students from urban settings, furthering our broader mission to support and inspire innovation in education beyond our walls.

Some of the more exciting and creative STEM projects at Acera that we've shared with the broader community include those in the burgeoning fields of gene editing and the microbiome as well as a mobile virtual reality lab. Our programs uniquely combine science, engineering, and creativity with the development of emotional intelligence — facets found in programs such as our new computer science curricula, which was pilot tested over the past three years. This work exemplifies Acera's innovative and scalable educational solutions that are ripe for broader dissemination, and it is beginning to be recognized as such: Acera was recently featured on NPR and in the PBS series *Design Squad.*



Truly, every day Acera is alive with joyous, engaged students ages 5-15, doing incredible things! Here, learning is not about proving what you know, executing formulas, or solving a problem "the right way." Instead, we are fostering a school culture in which learning is about:

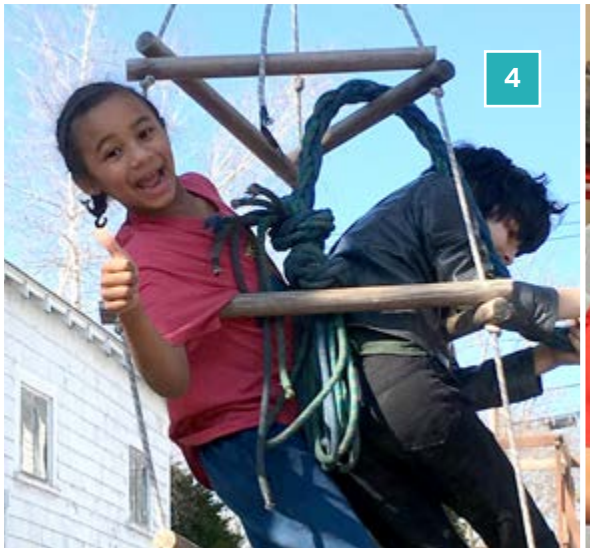
- Thinking at a systems level across different disciplines and balancing the capacities necessary for complex thinking.
- Knowing oneself, taking the perspective of others, working well with others, and taking responsibility for (and ultimately optimizing) one's impact on the community.
- Developing a deeper understanding of the relationships between things, and using flexible and creative thinking to generate new ideas that can only result from thoughtful questions.
- Achieving authentic engagement in ways that fit each child's interests, needs, and potential — *without any ceiling on what is possible.*

In this first ever annual report, we hope you get a glimpse into the unique educational experience we are creating, one which we believe should be possible for all students, everywhere.

Best,

Courtney Dickinson, Founder and Director

YEAR IN REVIEW



1 Cutting-edge: Acera students test and program VR applications

2 Free to create: students write & produce their own plays

3 Collaborations: The Handel and Haydn Society musicians play at the school

4 Movement makes better learners: Outdoor recess

5 Lab School: Students provide feedback on a new programming language, developed by MIT/SAP Labs

6 Acera's Scratch Day team after presenting at the MIT Media Lab

7 MA Representative Paul Brodeur meets "incredibly knowledgable students!"

8 Pushing progress: Acera's "Science, Music and the Art of Creative Thinking" event at the Broad Institute

9 MA State Senator Jason Lewis, Selma Svensden of iRobot, and Courtney Dickinson talk at Acera's Innovator Symposium.

10 Sean Gibbons of MIT's Microbiome Lab teaches 2nd and 3rd graders about microorganisms

ACERA'S **INNOVATOR SYMPOSIUM**

In April, we welcomed more than 200 guests to our school for our 5th Innovator Symposium. A free community event open to all, Acera's Innovator Symposium enables visitors to learn from and engage with innovators in some of the most groundbreaking fields. People of all ages learned about new immunotherapy drugs for cancer from a biotech industry leader; explored how biopolymer engineers at Tufts are crafting a functional model of the human brain out of silk; and got an inside look into how MIT's AI lab teaches a robot arm to manipulate objects, to name just a few of the 20+ presenters and stations.

At this event, there are no assumptions about what content is "appropriate" for children or for adults. As a result, students can enjoy conversations with leading scientists about complex research while adults run hands-on experiments, work in a wood shop, or design an electronic art project. It's one of the many ways Acera makes science accessible for all learning styles and all ages – learning without limits.

PAST SPEAKERS

Marc Abrahams
Founder, Ig Nobel Prizes and Annals of Improbable Research

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

Honey Bajaj
Co-Founder, Avir Technologies

Angela Belcher, Ph.D.
Professor of Biological Engineering and Materials Science, MIT Department of Biological Engineering

Hilary Binda, Ph.D.
Professor and Founding Director, Tufts University Prison Initiative

Cindy Bishop, M.A.
Interactive Digital Artist, Founder, VR Doodler (2016 MassChallenge Finalist)

Derek Blair
Senior Scientist, Takeda Pharmaceuticals

Peter Blake, Ed.D.
Professor & Director, Boston University Social Development and Learning Lab

Adam Cantor, B.E., M.E.
Senior Mechanical Engineer, iRobot

Tom Chang & Costas Zervos
Senior Software Engineers, iRobot

Nadia Chernyak, Ph.D.
Postdoctoral Fellow, Social Development and Learning Lab, Boston University

Anthony Chhoy
Co-founder and CFO, Makers Empire

James Cleary, M.D., Ph.D.
Dana Farber Cancer Institute

Roisin Commane, Ph.D.
Postdoctoral Fellow, Harvard Biosphere Group

Liz Dawes Duraisingh, Ph.D.
Principal Investigator, Out of Eden, Harvard Graduate School of Education

Stefania Druga, M.Ed.
Research Assistant, MIT Media Lab

Mark Fishman, M.D.
President Emeritus, Novartis Institutes for Biomedical Research

Martha Fishman, M.D.
Co-Director, Interstitial Lung Disease Program and Director, Ambulatory Clinics, Boston Children's Hospital

Rich Fletcher, Ph.D.
Assistant Professor, UMass Medical School

James Fox, M.S.
Co-founder and CEO, OBZ Design

Jean Berko Gleason, Ph.D.
Professor of Psychology, Boston University

Christina Glover, B.F.A.
Designer & Open Style Lab winner, creator of EASE

David Grayzel, M.D.
Partner, Atlas Ventures

Mathieu Groussin, Ph.D.
Postdoctoral Associate, Alm Lab, MIT

Forest Handford
DevOps Lead, Games Evangelist, Affectiva

Kimberly Homan, Ph.D.
Research Associate, Wyss Institute for Biologically Inspired Engineering at Harvard University

Rebecca Kleinberger
Research Assistant, Opera of the Future, MIT Media Lab

Marcio Macedo
Director of Product Development, iRobot

Ed Miracco
Senior Scientist, Moderna Therapeutics

Shirley O' Neil
CEO, Sonzia

Youssef Saleh
Founder & CEO, AvaRobotics

Jim Shaw, M.B.A., M.S.
Founder and Managing Director, FastWay Engineering

Ainara Sistiaga, Ph.D.
Postdoctoral Fellow, MIT Department of Earth, Atmospheric and Planetary Science

Selma Svendsen, M.S.
Senior Director, iRobot

Rad Duintjer Tebbens, Ph.D.
Vice President, Kids Risk

Meredith Thompson, ME.d.
Science Educator, MIT Education Arcade

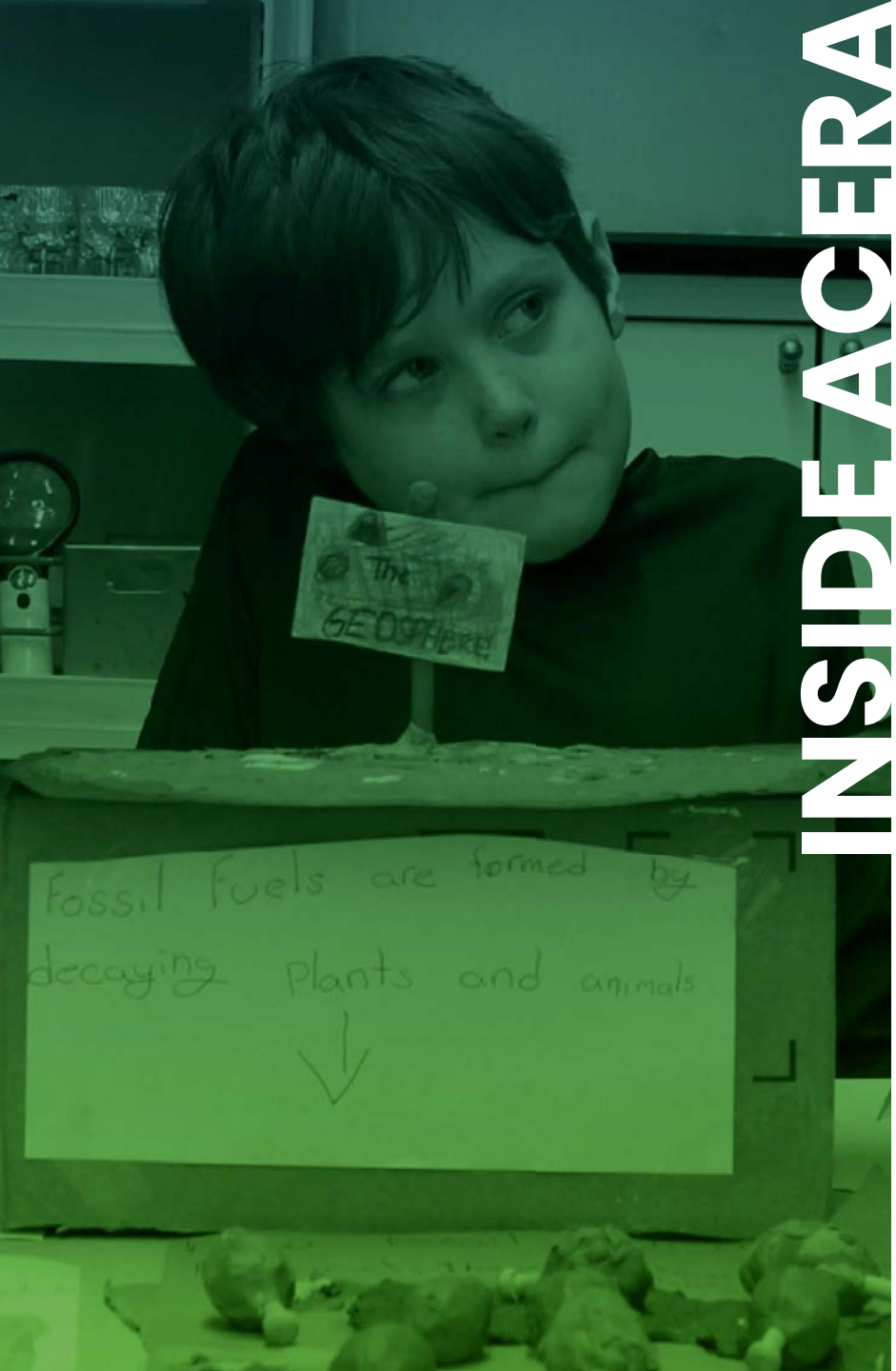
Marshall Wentworth, M.S.
Vice President, MIT's Unmanned Aerial Vehicle Team

Sinyun Yang, Jingijing Xi, David Harari
Founders, BrainCo

Peter Yu, M.S., Ph.D.
Student, MIT CS and AI Laboratory

Michelle Zhang, Ph.D.
VP of Research and Development, Kyn Therapeutics

Mark Fishman, M.D., President Emeritus, Novartis Institutes for Biomedical Research, discusses how zebrafish are used in biomedical research.



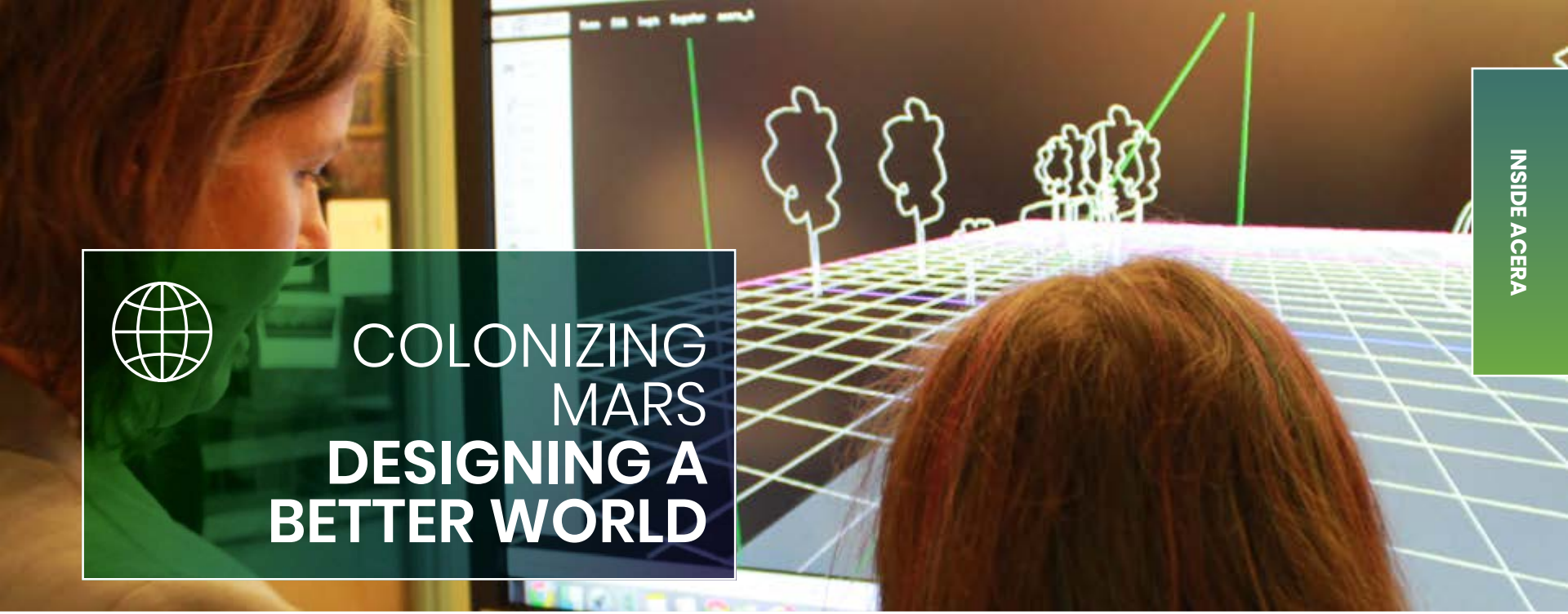
INSIDE ACERA

SIMULATING CLIMATE CHANGE

GLOBAL IMPACT OF SCIENCE AND ECONOMICS

How do you make a complex issue such as climate change accessible to 3rd and 4th graders? In Mr. Eric's class, students examined some of the rules governing the U.S. economy and what impact they have on climate change. In a simulation, students acted as CEOs of companies and decided how many products to produce, vying to make the most money. However, more products also meant more CO_2 was released by their factories. Quickly, students pushed the world over its tipping point, resulting in environmental destruction. Next, the class investigated how they could change the rules to incentivize environmental as well as economic success, researching topics such as the Paris Agreement, consumer advocacy, and carbon credits and then proposed new rules and interventions.

★ **Eric Fishman is a core classroom upper elementary teacher at Acera.**



COLONIZING MARS **DESIGNING A BETTER WORLD**

Miss Anastasia's 2nd and 3rd graders took inspiration from a NASA curriculum and set to work on designing a colony on Mars. Students were prompted to consider what elements of their earthly communities they would keep and which they would get rid of or improve. What are the advantages of how we live and what are the drawbacks? In groups, students brainstormed and then created models of their colony ideas using upcycled materials. While coming together to share their designs and solutions, the students decided to combine all projects into one big colony. With the pooled resources, they were able to create an even more complete and sustainable colony: Marstropolis.

★ **Anastasia Leyden is a core classroom intermediate elementary teacher at Acera.**

"At Acera, children do not just learn the advanced science and math behind engineering, they apply this knowledge in a fully equipped workshop with the gamut of materials, including wood and metal and professional grade tools. Students learn to create safely and they truly understand the often missed connection between what works on paper and what works in real life."

– Rachel Klopfer, parent

DEMOCRACY IN ACTION

Last year's campaign and election process galvanized Ms. Kim's upper elementary class to become active, informed citizens. In tandem with reading the U.S. Constitution, learning how the news is reported, and understanding the process of fact-checking, students selected current political issues about which to develop expertise and policy positions. The topics included the Dakota Access Pipeline, healthcare legislation, voting rights for felons, and animal welfare, among many others. After writing letters to public officials about their issues, students felt compelled to further advocate their topics. In March, we met with state senators and representatives at the Massachusetts State House. The kids wowed their legislators with their specific questions and policy ideas but made sure not to leave without collecting their signatures—one does need autographs from one's heroes, after all.

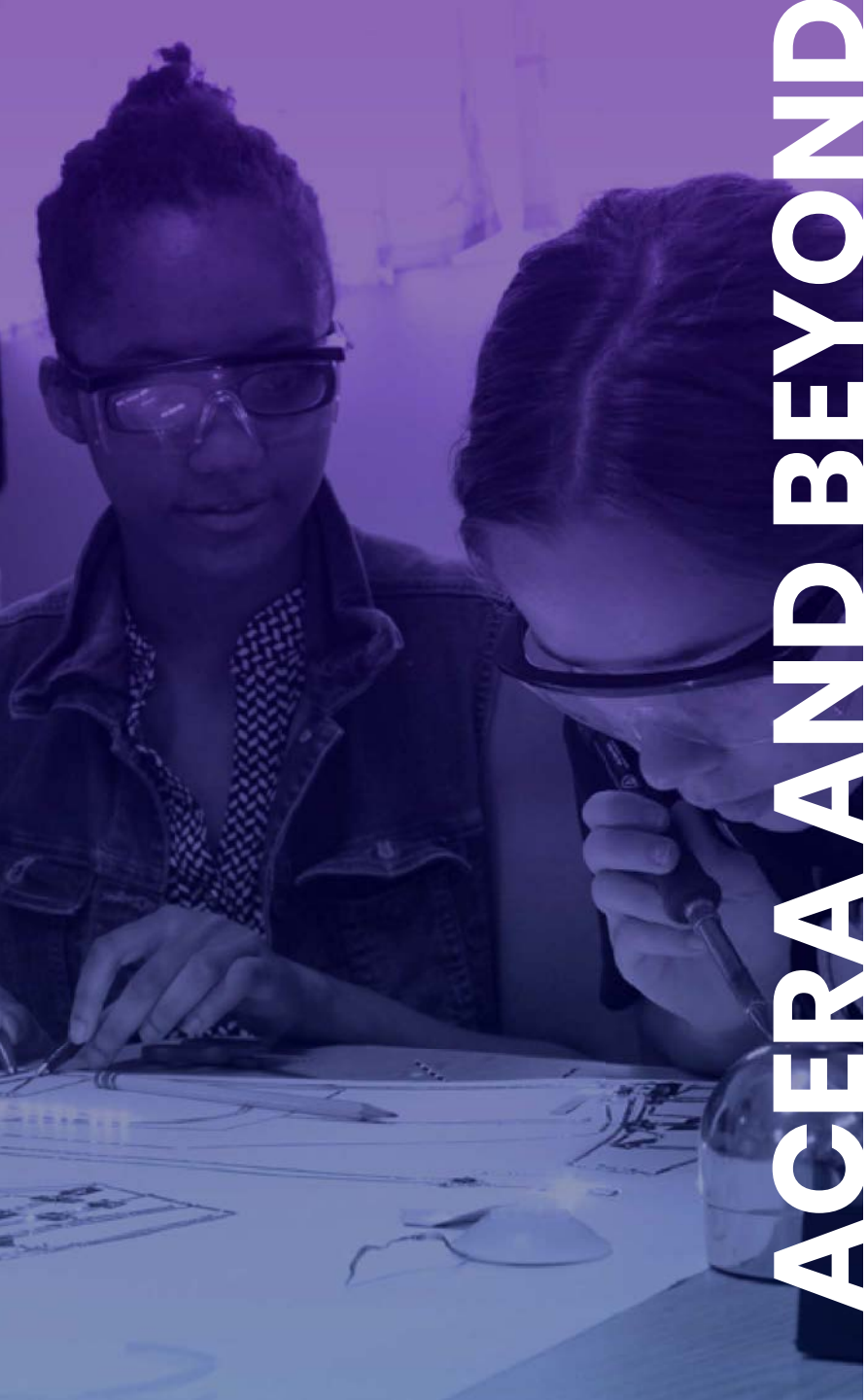
Students continued to research, write postcards, and talk constantly about policy. By May, that energy had propelled us to Washington, D.C., where we visited NPR, witnessed the House of Representatives in session, and were invited into the office of Representative Katherine Clark.

There, students spoke eloquently about their own and others' policy issues and asked questions that reflected their deep and current knowledge of the landscape of American politics and government.

" Democracy is not only being able to vote for the people that run our country, but also influencing each of their decisions. Each time you write an email or make a phone call to anyone in the government, both federal or state, you are helping improve democracy but you are also being the democracy by exercising your rights and freedom."

– Mira L., upper elementary student

★ **Kim Machnik is a core classroom upper elementary teacher at Acera.**



ACERA AND BEYOND

SEEDS STUDIO & TEACHER TRAINING

Imagine a place where youth can identify their creative self, develop a powerful vision, pursue a passion, and create an impact that matters in their worlds. Imagine an approach to learning that inspires students and teachers alike to fearlessly invent new forms of storytelling and new ways of "making" with technology. That's just what it's like in Acera's SEEDS StudioLab. Founded in 2016 by Alisha Panjwani, SEEDS stands for Science, Engineering, Esthetics, Design, and Storytelling. The Lab enables children to explore and design meaningful projects while gaining knowledge with and confidence in science, technology, art, engineering, and math concepts.

By using low-cost materials and inventing new ways to use affordable tools, Alisha showcases that making and tech exploration do not require expensive equipment. At various conferences as well as two teacher trainings organized in 2017, Alisha shared with hundreds of public and private school teachers how they can bring this approach, new technologies, and playful learning into their classrooms.

★ **Alisha Panjwani is an IMP mentor, enrichment teacher, and SEEDS Design Studio Manager at Acera.**

GENE EDITING IN MIDDLE SCHOOL

As a former Kendall Square biotech scientist, Acera middle school teacher Michael Hirsch is accustomed to working with cutting-edge technology in the lab. So when Amino Labs, an MIT spinoff, was looking for an early adopter to test the prototype of their education-focused genetic engineering kit, Michael didn't think twice about volunteering Acera. Since the first round of working with Amino Labs in summer 2016, our students have not only learned the fundamental tenets of genetics, they have successfully used CRISPR – ground-breaking gene editing technology – to cut and exchange their bacteria's DNA.

This is so novel and unusual for middle school students to be exploring that NPR and two other publications featured Acera in their reporting this summer.

Our students consistently provide feedback to Amino Labs' founders as they refine their product. As part of this ongoing collaboration, Michael is currently writing a book on teaching synthetic biology using the all-in-one Amino kit.

★ **Michael Hirsch is an IMP mentor, science lab lead teacher, and SEEDS Lab Manager at Acera.**

RESEARCHING LEARNING

Competencies such as systems thinking, problem solving, frustration tolerance, and emotional intelligence are fundamental to success in our modern world. And yet, there are few studies that help educators understand how these competencies develop in young minds and how they can best be taught in school. To help bridge this gap and connect the science of learning with the art of teaching, Acera collaborates with researchers at Harvard's Graduate School of Education, MIT, and Tufts.

"I really like Acera because it's a community where I can be myself, and I know it's what everybody says, but it is true!"

– Allison, 6th grade

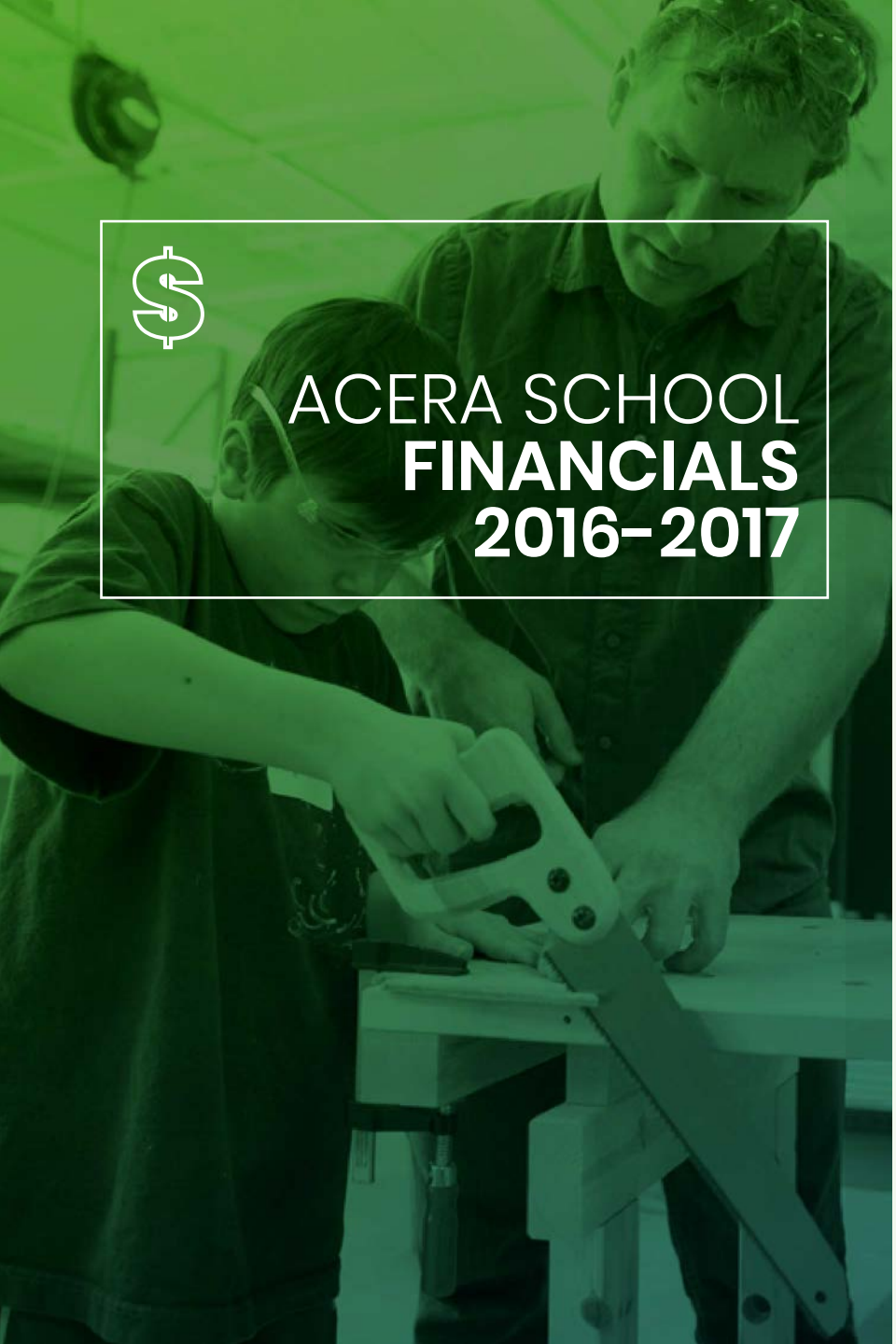
Computational thinking and CS literacy are essential 21st century skills, but how can we teach these effectively, especially to young students? In a remarkable example of how collaboration across disciplines fosters innovation, an Acera-led initiative enabled two of its teachers, Katie Semine and part-time teacher Kate Fractal, to assemble a curriculum that answers this question and sets young students up for success in computer science.

"Understanding Computers, Understanding Ourselves" teaches students grades 2-5 introductory computer science in combination with social emotional learning. Pilot-tested and refined over three years, the curriculum uses role play, hands on activities, games, movement, and class discussions to demystify computers, avoid student frustrations, and connect off-screen and on-screen learning. It includes activities such as taking apart floppy disks or identifying computers in everyday objects. By building both social and computing competence and proficiency, the curriculum shows that children can learn big ideas in computer science at a younger age, leading to advanced programming skills.

★ **Katie Semine is an intermediate elementary teacher at Acera. Kate Fractal is a part-time mathematics teacher at Acera.**

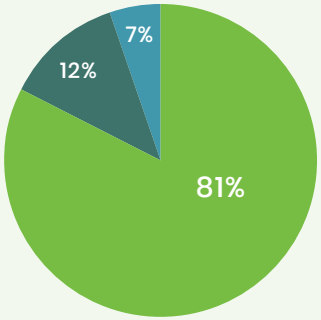
Led by Gus Halwani, our research initiative is developing study designs and frameworks to document and assess what and how students learn at Acera, where we emphasize competency-based learning. For example, Gus is developing a virtual reality experience that challenges middle school students to develop deeper cross-conflict empathy and perspective-taking skills. VR technology also allows him to collect behavioral data to assess if and how the intervention is working. Through this research, we hope to strengthen our program and promote evidence-based teaching in our community and beyond.

★ **Gus Halwani is an IMP mentor and Director of Research and Assessment at Acera.**



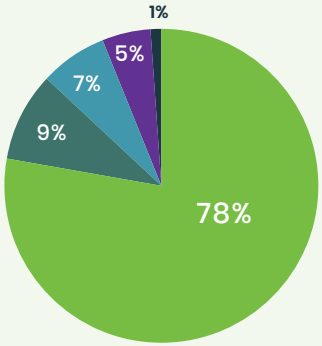
ACERA SCHOOL **FINANCIALS 2016–2017**

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

Tuition	$2,302,880
Enrichment Programs	356,000
Donations	200,000
	$2,858,880



EXPENSES

Salaries, Benefits & Taxes	$2,199,918
Faclilities	246,837
Classroom Expenses	190,400
General Admin	139,000
Marketing	38,000
	$2,814,155

ANNUAL LOVE TO LEARN EVENT THANK YOU!

Thank you to our generous families and friends of Acera for your financial contributions to the school and our community this year. We also want to thank the following businesses for their generous contributions to our Annual Fund and Love To Learn event. This support makes it possible for us to serve more families in Massachusetts.

80 Thoreau Concord
Ace Fells Hardware Store
Anthony Reynolds, Artist
Atlas Venture
Bespoke of Winchester
BK Organizing
Bill Dickinson
Bookends Winchester
Buckalew's Melrose
Chamber of Comics
China Sky Winchester
Courtney Dickinson, Artist
Derby Florist Arlington
Firebeat Dancesport Studios
Fitness Together
Fuller Cup Winchester
Get in Shape for Women Winchester
Ghost Tequila Boston
Gingerbread Construction Co.
Greek Grille Winchester
Joy Yoga Melrose
Kenneth Freed & Company, PC
Larry Lapson
Mountain Strength CrossFit
Neem Medical Spa
New England Patriots
Pondview Florist
Providence Bruins
Salone Estetics
Sonos
Taza Chocolate
Total Wine & More
Stems Florist
The Waterfield Kitchen Winchester
Union Brewery, Providence, RI
Whole Foods
Winchester Center for Acupuncture

The Reed Hollett Enrichment Scholarship Fund

In February of 2015, Reed Hollett, a beloved Acera teacher, passed away unexpectedly. Reed led Acera's after-school programs, with a focus on Outing Club and Construction Corner. 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.

This year, we were proud to partner with Reed's parents in creating the **Reed Hollett Enrichment Scholarship Fund.** The fund gives scholarships to low-income students to participate in Acera's after-school and summer camp programs. In 2016-2017, this fund provided scholarships to six students.

ACERA STAFF*

Courtney Dickinson, Founder & Director
B.A., Dartmouth College Certified Teacher
Leadership & Company Culture Consultant/
Culture Architect, Sapient Corporation

Josh Briggs M.S., Woodworking & Engineering Teacher, Workshop Manager
B.S. and a B.A., University of Notre Dame
M.S. Civil Engineering, University
of New Hampshire

Malcolm Campbell, M.A., Assistant Director of School
B.A., Fairhaven College
M.A., Counseling Psychology, C.I.I.S.

Bob Defandorf, M.Ed., Middle School Teacher
B.A., Wesleyan University
M.Ed., Lesley University

Hannah DeRusha, M.Ed., Cross Classroom Teacher
B.S., MIT
M.Ed., Boston University

Ruma Dutta, M.Ed., Middle School Core Classroom Teacher
B.A., Philosophy, Mount Holyoke College
M.Ed., Elementary Education, Lesley University

Eric Fishman, Upper Elementary Teacher
B.A., Yale University

Stefanie Friedhoff, Director of Partnerships and Outreach
2000-2001 Nieman Fellow at Harvard University

Gus Hawani, Ph.D, Director of Research and Assessment
B.A., University of South Florida
Ph.D., Neuroscience, Harvard-MIT

Estee Hill, M.A.T., Cross Classroom Teacher
B.A.R., University of Cape Town
M.A.T., Tufts University

Michael Hirsch, M.A.T, Science Lab Manager
B.A., Clark University
M.A.T., Salem State

Sara Honeywell, Office Manager & Front Desk
B.A., Berklee College of Music

Mani Kadiyala, M.A., Assistant to the Director & Development Coordinator
B.S., Texas A&M University
M.A., Biology, Harvard University

Anastasia Leyden, M.Ed., IE Core Classroom Teacher
B.A., Williams College
M.Ed., Lesley University

Kim Machnik, Upper Elementary Teacher
B.A., Brandeis University

Nicole Notaro, M.Ed., Upper Elementary Teacher
B.A., Tufts University
M.Ed., Tufts University

David Olson, M.Ed., Lower Elementary Teacher
B.A., University of Massachusetts, Amherst
M.Ed., Lesley University

Alisha Panjwani, Founder and Head of Acera SEEDS Studio Design Lab
B.Sc., Fashion Design, Annamalai University
M.S., Media Arts and Sciences, Media Lab, MIT

C. Trent Ramsey, Director of Strategic Advancement
B.A., Birmingham-Southern College

Anthony Reynolds, M.Ed., Integrated Arts, Performance and Music Teacher
B.A., Herron School of Art, Indiana University
M.Ed., Boston University

Vanessa Roman, Teacher in SEL, Kinetic Mathematics, Human Sexuality and Theater Arts
B.A., Salem State College

Katie Semine, M.Ed., Lower Elementary Teacher
B.A.,Tufts University
M.Ed., Tufts University

John Wensman, M.A.T., Director of Administration, Operations, and Enrichment
B.A., University of Minnesota
M.A.T., Brown University

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

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

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

*Full Time Acera Staff as of printing 12/1/17. Additional part-time staff include math, computer science, creativity morning, and woodshop teachers.

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, to enable the rapid and flexible growth of a start-up school.

Courtney Dickinson, B.A., CHAIRMAN
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


TEAM NAMES
NAMES
TOOL APRONS
TEAM BINS
THEN

ACERA EMBRACING THE FUTURE

"I wish that every single day in the week was school, even the weekend!"

– Sabina, Kindergarten

The Acera School has come a long way since Courtney Dickinson first shared her vision for redesigning education across Greater Boston eight years ago. From the days when the first Acera families turned a dilapidated building into a learning space by painting walls and hardwiring Internet access, to today's active and diverse community of current and alumni families, friends, and collaborators, Acera's mission holds strong: to enable students to learn based upon ability and motivation, not age. We do this while safeguarding the spirit and innate curiosity of each child, focusing on inquiry, creativity, and complex thinking in order to inspire the leaders and innovators of tomorrow. This is what we do. Together.

Partnerships and collaborations are crucial to the success of our school and enable us to offer unique learning experiences to our students. As Acera transitions from its start-up phase into an organization that is here to stay, the ongoing support of parents, alumni families, friends, relatives, businesses, foundations, and the community at large is essential.

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

Trent Ramsey
Director of Strategic Advancement at Acera School
781-729-3489 (office) | 781-558-4509 (cell)
trent@aceraschool.org

The Massachusetts School of
Science, Creativity and Leadership

Acera School
Phone: 781.729.3489
5 Lowell Avenue
Winchester MA 01890

aceraschool.org