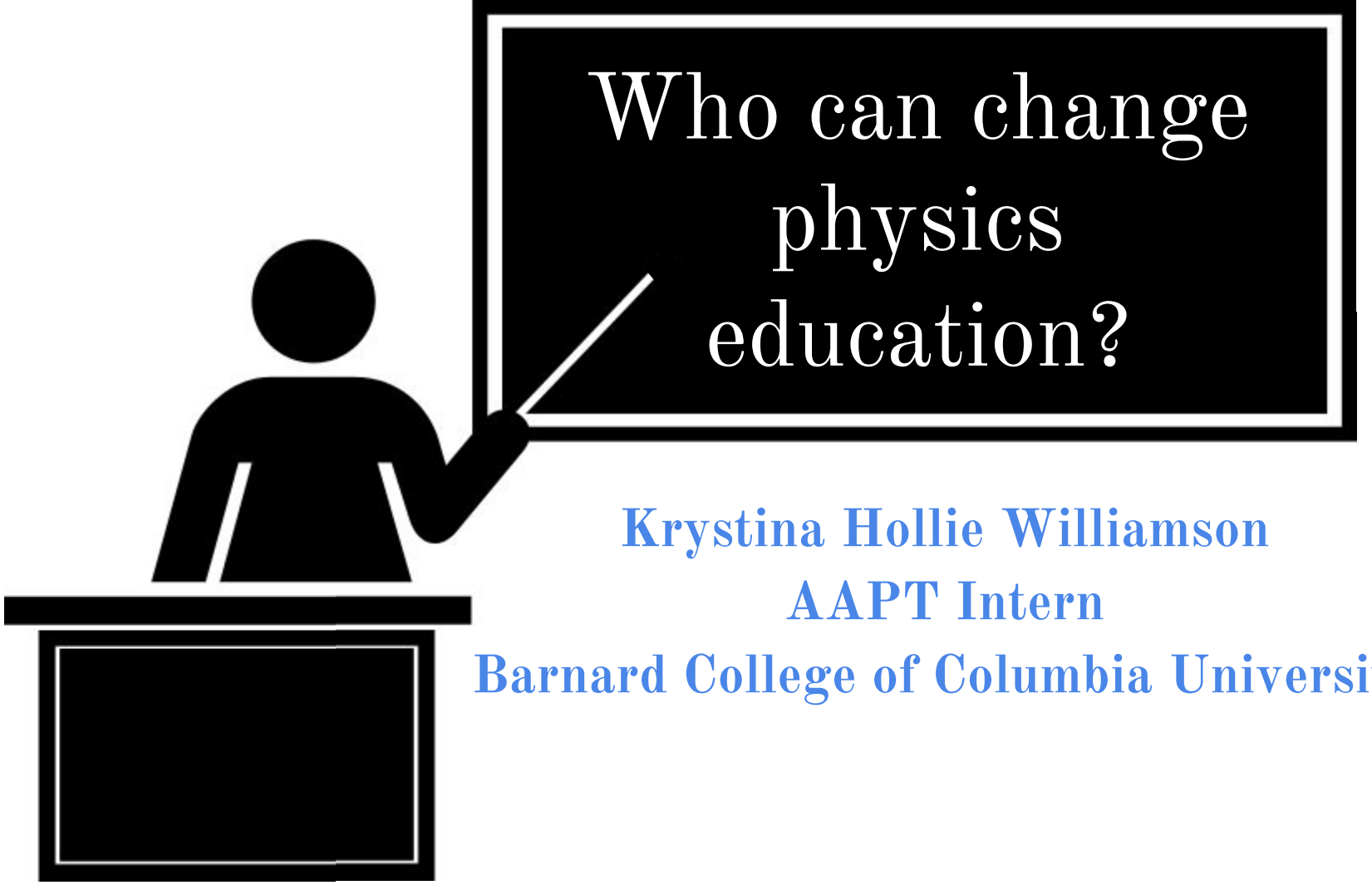


Krystina Hollie Williamson
AAPT Intern
Barnard College of Columbia University

AAPT
PHYSICS EDUCATION

Overview:

1. Background on my Internship
2. Education Technology
3. Education Research
4. Education Policy
5. My Next Steps

My experiences have led me to think often and a lot about physics education.

Who makes decisions and creates change in physics education?

What influences one's physics identity?

How do we create inclusive physics classrooms with diverse students?

The Life of an AAPT Intern

- Edited and wrote grant proposals.
- Edited, created and conducted outreach activities and materials.
- Organized and supported conferences and workshops.

Pictured: Krystina talking to teachers at the AAPTSM about the Sunspots Digikit.

Education Technology

Computational Modeling in Physics First Classrooms in Chicago, Illinois.

- Physics First - Where a student takes physics in the ninth grade.

- Modeling - a method of teaching physics which involves presenting multiple models of a phenomena.

AMTA

AAPT
PHYSICS EDUCATION

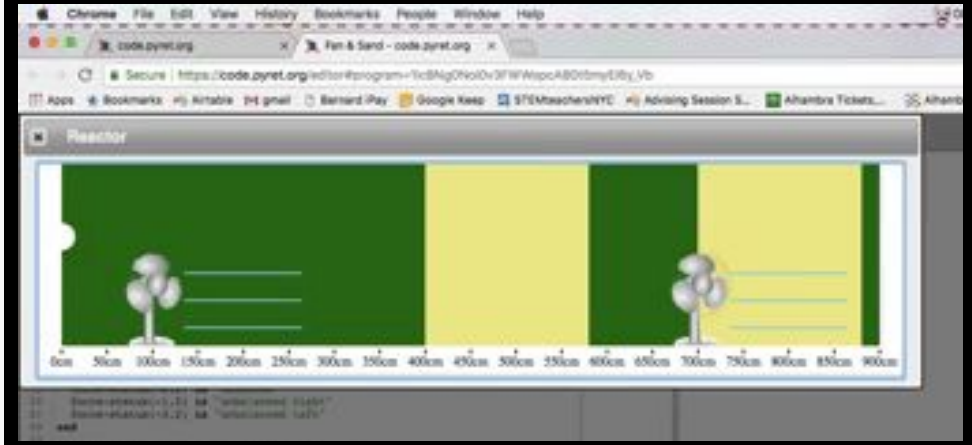
Bootstrap
+computing creatively thriving mathematically

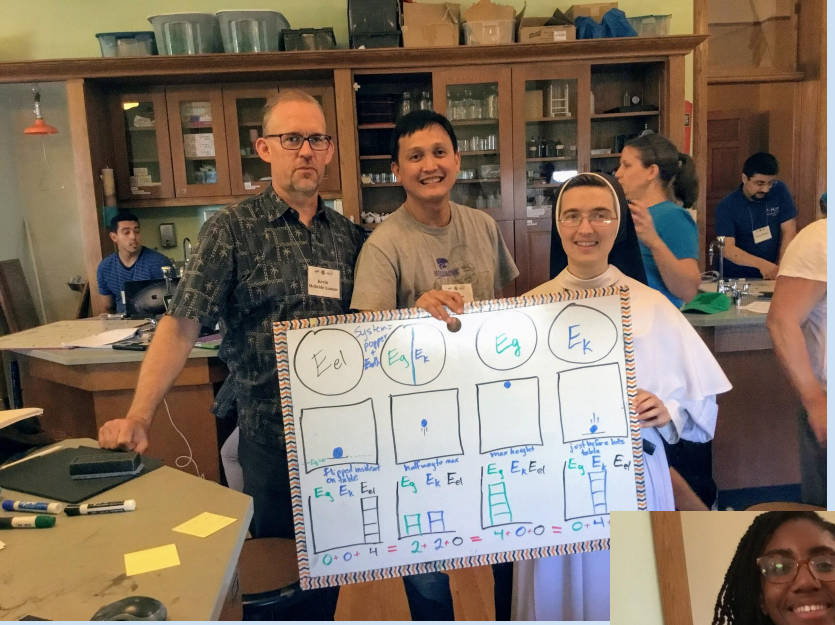
File (Fan & Sand) | Insert | Publish

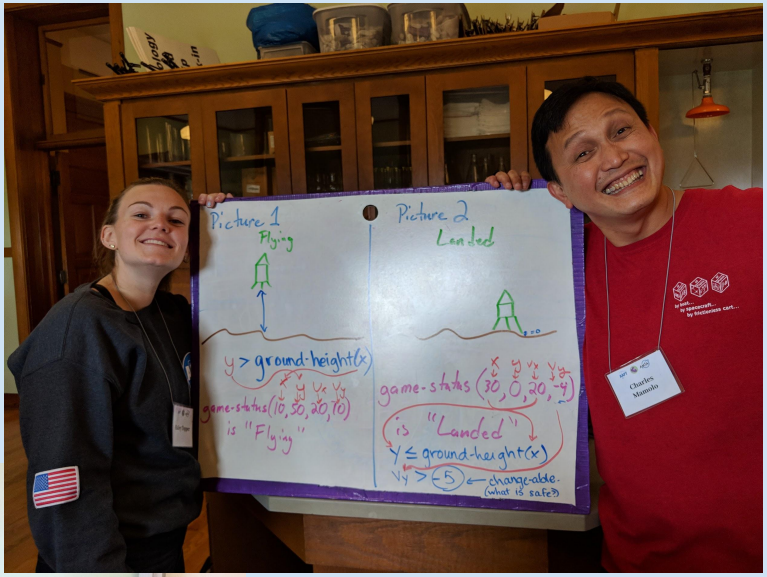
```
include shared-gdrive("Fans", "1gdRcQfpZ6fRXrw0kYsL0O3pRCZwHMYX6")

init-x = 0
init-v = 65
delta-t = 0.1


# Write a function force-status that consumes the sand-force and the fan-force
# as numbers representing units of force, and produces one of three strings:

# - "unbalanced-left" if the left-directed force is greater than the right
# - "unbalanced-right" if the right-directed force is greater than the right
# - "balanced" if they are the same

force-status :: Number, Number -> String
#where the force-status consumes two numbers, the sand force and the fan force
#and then produces a string

examples:
  force-status(-2,2) is "balanced"
  force-status(-1,2) is "unbalanced right"
  force-status(-3,2) is "unbalanced left"
end

fun force-status(sand-force, fan-force):
  if (sand-force + fan-force) == 0 : "balanced"
  else if (sand-force + fan-force) >= 0 : "unbalanced right"
  else if (sand-force + fan-force) <= 0 : "unbalanced left"
  end
end


# This kicks off the simulation
start(init-x, init-v, delta-t, force-status)

#picture of map highlighting sectionyou have, system schema for both math scenarios, and force diagram for both
```

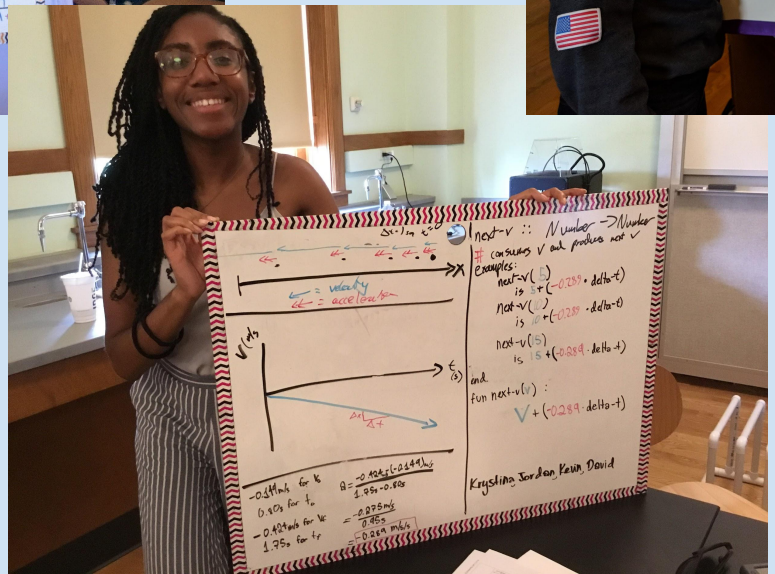
Goal:

Create an animation to show how a ball would slow down or speed up when rolling through sand or in front of a fan.




Eel
Eg
Ek
Eg Ek Eel
0+0+4 = 2+2+0 = 4+0+0 = 0+4


Picture 1
Flying
Picture 2
Landed
y > ground-height(x)
game-status(10, 50, 20, 10)
is "Flying"
game-status(30, 0, 20, -4)
is "Landed"
y ≤ ground-height(x)
vy > -5 ← change-able.
(what is safe?)
Charles Mamolo


next-v :: Number -> Number
consumes v and produces next v
examples:
next-v(15)
is 15 + (-0.289 · delta-t)
end
fun next-v(v) :
V + (-0.289 · delta-t)
Krystina, Jordan, Kevin, David

Education Research

Conference in Miami, Florida

Conference Goals:

- Reveal and review data on effectiveness of SU4W materials.
- Revise SU4W Materials.
- Brainstorm ways to propagate SU4W.

It's me!
Finish In 4
SAVE MORE

Education Policy

AAPT/AIP Master Teacher Policy Fellows

There are so many people who affect education policy.

- National Association for the Education of Young Children
- Organization of American States
- The National Academies
- U.S. Department of Education
- State Science Supervisors
- Local Chambers of Commerce
- American Association of Colleges for Teacher Education
- American Society of Engineering Education
- National Governors Association
- National Science Foundation

Teachers and students can -and do!- cultivate change.

My Next Steps:

- Developing and organizing collaboration between AAPT and Math Teacher's Circles.
- Co-leading a SU4W workshop for STEMTeachersNYC.
- Promote community building and deeper understanding of physics at my college.

Thank you:

- Rebecca Vieyra
- Every teacher I've met
- The SPS Intern Family
- AAPT, SPS, APS & AIP

What questions do you have?