P.M. Presenter Abstracts

Parallel Session C - Tech 222	
Time	**12:45 - 1:05**
Presenter	**Marco Daniel Machado** *The New School* machadom@newschool.edu
Topic of Talk	*STEM Instruction in the Pop Culture Classroom*

STEM instruction has seen graphic representations be used alongside text to improve student comprehension and retention for decades. With the rising popularity of comics, manga, and graphic novels in pop culture, an opportunity to further engage students by combining this pedagogical strategy with characters and themes students are familiar with has presented itself in the science classroom. Come see specific examples of how new media can be used to improve student interest, assessment variety, and content literacy, as well as learn about some of the best comics and graphic novels for teaching physics.

Time	**1:10 - 1:30**
Presenter	**Rich Terwilliger** babyblueazurite@aol.com
Topic of Talk	*Terwilliger's Physics*

This presentation is a brief introduction to Terwilliger's Physics, a collection of over six-hundred Microsoft Word, Excel and PowerPoint documents that have been classroom tested and revised many times according to student suggestions. Terwilliger's Physics allows you to flip your classes and spend precious time developing more demonstrations, labs, and classroom activities. Why spend hours developing worksheets and class lesson plans or searching the web for mediocre material when you can have it all with just a couple clicks of the mouse?

Time	**1:35 - 1:55**
Presenter	**Karen Magee-Sauer** *Rowan University* Sauer@rowan.edu
Topic of Talk	*Get the Facts Out – Changing the Conversation around STEM Teaching*

The shortage of highly qualified high school physics teachers is well-documented and remains at the top of fields with "considerable shortage" as reported by the American Association for Employment in Education (AAEE) Educator Supply & Demand 2016-2017 report. This shortage is a severe and long-term problem. The American Physical Society, American Association of Physics Teachers, Math Association of America, American Chemical Society, and other university and education organizations have joined forces in a "Get the Facts Out" project that addresses misperceptions and myths surrounding high school physics teaching as a career which can affect student career choice. This talk will present sample ideas and materials from the "Get the Facts Out" toolkit to help high school teachers start the conversation with students to introduce high school teaching as profession.

Parallel Session D - Tech 220	
Time	12:45 - 1:05
Presenter	**Fernando Espinoza** *Hofstra University* Fernando.Espinoza@hofstra.edu
Topic of Talk	*Impact of Guided Inquiry through Simulations on the Improvement and Retention of Knowledge of Electricity and Wave Motion*

Content improvement and retention are crucial measures of a learner's ability to benefit from further exposure to disciplinary core ideas, as declared by the Next Generation Science Standards (NGSS). The impact of inquiry-based instruction using simulations on the improvement of content knowledge of electrostatics and electric fields, as well as electromagnetic and mechanical wave properties was the subject of this investigation. Groups of high school and undergraduate students performed a series of tasks in three studies. The objective was to determine the effectiveness of exploratory/investigative approaches to the study of electricity and wave properties in fostering content improvement and retention, as well as in comparison with traditionally performed experimental activities. The results show that a guided inquiry-based method significantly helps students to improve content knowledge of electricity and of particularly difficult aspects of wave phenomena, such as diffraction relationships, the inverse-square dependence of intensity on the distance from a source of waves, and the effects of the transmitting medium on the speed of a wave. Additionally its exploratory nature is superior to the confirmatory laboratory experience, both in content retention and in facilitating the incorporation of perceptual features that help learners deal with documented challenging properties of waves.

Time	1:10 - 1:30
Presenter	**Bart Horn, Peter Gilmartin** *Manhattan College* bhorn01@manhattan.edu
Topic of Talk	*Observable relics of the simple harmonic universe*

The current explosion of precision data for early universe cosmology is creating opportunities for cutting-edge student research, using and modifying existing software packages such as CLASS and MontePython in order to simulate the growth of primordial structure, and to compare predictions against publicly available data. We analyze possible observational signatures corresponding to the "simple harmonic universe", which consists of spherical spatial curvature, negative vacuum energy, and one or more exotic matter sources, which then quantum tunnels and/or evolves into our present observer patch.

Time	1:35 - 1:55

Presenter	**David Liao** Department of Pathology University of California, San Francisco San Francisco, CA David.Liao@UCSF.EDU
Topic of Talk	*A SiQuENC for developing written REASoNing for APPhysics 1*

We present two mnemonics for AP Physics 1-style problem-solving. "SiQuENC" outlines use of multiple representations, and "REASoN" lists points that can support written explanations. SiQuENC is 1 based on problem-solving steps described by Etkina et al. and stands for "Neatly and graphically represent Situation(s)", "Graphically represent Quantities and their relationships", "Identify relevant allowed starting point (in)Equation(s)", "ANalyze, which does not necessarily mean just algebra", and "Communicate". REASoN is related to scaffolds for composing scientific explanations, 2 but is particularly specialized for AP Physics 1 and 2. REASoN stands for "State and walk through a relevant Relationship from allowed knowledge", "State what quantities, if any, are Equal, and why", "State what quantities, if any, are Altered or different, and why", "So what?", and "Is there any quantity to analyze Next?"