

# Journal of STEM Education: *Innovations and Research*

Volume 17 • Issue 4    October-December 2016



Editorial Review Board	2
International Editorial Advisory Board	3
Editorial	4

## FEATURES

<b>The Policy of STEM Diversity: Diversifying STEM Programs in Higher Education</b>	5
Calvin Briggs	



<b>Bridging the Valley: Recruiting and Retaining STEM Majors</b>	8
Bob Kolvoord, Robyn Puffenbarger, Ray McGhee, Roman J. Miller, Ken Overway, Kenneth Phillips, Lynne Ryan, Jennifer Sowers and Jordan Brown	



<b>Preliminary Validation of a Critical Thinking Rubric for Fluid Mechanics and Heat Transfer</b>	19
Paul Golter, Gary Brown and Bernard Van Wie	

<b>The Implementation of Senior Design Capstone Projects Combining Engineering and Business Students</b>	29
Matthew Franchetti and Sonny S. Ariss	



<b>Using the Five Whys Method in the Classroom: How to Turn Students into Problem Solvers</b>	35
Saeed Moaveni and Karen C. Chou	

<b>Finite Element Modeling of Bolted Connections for a Steel Sculpture</b>	42
Saeed Moaveni, Supachard Krudtong and Karen C. Chou	

<b>The Current Status of STEM Education Research 2013-2015</b>	52
Staci Mizell and Sue Brown	

## RESEARCH BRIEF

<b>Assessing the Long Term Impact of a Statewide Nanoscience Education Program</b>	57
Boris Kiefer and Elba E. Serrano	

Instructions for Authors	58
--------------------------	----

Contribution Form	59
-------------------	----



@JournalofSTEMEd



Journal of STEM Education

*The Journal of STEM Education: Innovations and Research* (ISSN 1557-5284) is published by The Institute for STEM Education and Research, P.O. Box 4001, Auburn, AL 36831. [www.jstem.org](http://www.jstem.org) The Institute for STEM Education and Research is a non-profit entity. Periodicals postage rate paid at Auburn, AL and additional mailing offices.

CONTRIBUTIONS are greatly appreciated and are tax-exempt.

PERMISSION FOR USE: The copyright owner's consent does not extend to copying for general distribution, for promotion, for creating new works or for resale. Specific written permission must be obtained from the publisher for such copying.

Copyright © 2012 by The Institute for STEM Education and Research. It is a condition of publication that manuscripts submitted to this journal have not been published and will not be simultaneously submitted or published elsewhere. By submitting a manuscript, the authors agree that the copyright for their article is transferred to the publisher if and when the article is accepted for publication. The copyright covers the exclusive rights to reproduce and distribute the article, including reports, photographic reproductions, microfilm or any other reproduction of similar nature and translations. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, electrostatic, magnetic tape, photocopying, recording or otherwise, without permission in writing from the copyright holder.