



GROWING FUTURE INNOVATORS, CREATORS, AND MAKERS FOR THE 21ST CENTURY

**STEM NOLA**

SCIENCE • TECHNOLOGY • ENGINEERING • MATH

Presented by **Calvin Mackie, PhD**



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## ABOUT STEM NOLA

### Our Mission

STEM NOLA's goal is to design and deliver activities, programs, and events across the city that bring inspiration, engagement, and exposure. Members of the community will learn about opportunities in the fields of Science, Technology, Engineering and Math (STEM).

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### About Us

STEM NOLA (SN) was founded by New Orleans native and former tenured Tulane University Engineering professor, Dr. Calvin Mackie. The purpose of its existence is to expose, inspire, and engage members in the surrounding communities about the opportunities in Science, Technology, Engineering and Mathematics (STEM). STEM NOLA will design and deliver activities, programs and events that bring inspiration, motivation and training to all STEM stakeholders, specifically focusing on underserved communities, across the city. Participants will receive the opportunity to obtain 21st century skills of communication, collaboration and critical thinking. STEM NOLA realizes that any effective community-based STEM program must be broad enough to include everyone, yet focused enough to reach the people where they are, on their level, and, taking them to where they need to be to succeed in life.

STEM NOLA's goal is to design and deliver activities, programs & events across the city that bring inspiration, motivation and training to all STEM stakeholders (especially students). SN has organized a group of highly trained and seasoned individuals with broad backgrounds and experience at all levels to train students, parents, and educators in the necessary areas of professional and human development. Such training will focus on providing the necessary skills to increase exposure, participation, retention, and graduation in STEM from Kindergarten students to doctorate scholars.



## Our Programs

### **STEM SATURDAYS WITH DR. MACKIE:**

Monthly, citywide family and community-based academic events in which students can participate in STEM activities. The goal of this program is to engage the entire community around STEM. By holding widely publicized events on a specific monthly weekend, all participants; parents, teachers, community volunteers and/or corporate volunteers will be given an opportunity to engage children in fun STEM and educational activities. **STEM Saturdays with Dr. Mackie** provide urban youth with activities that create curiosity about life, education, and careers in STEM. SN is partnering with the New Orleans Recreation Development Commission (NORDC) to host these life changing events at NORDC facilities across the city. Each STEM Saturdays is focused on a topic, such as: Renewable Energy, Simple Machines, Rocketry, and so much more!

### **STEMEDU:**

Hands-on project based programming with the flexibility to be delivered during a class or after school. Programming will parallel classroom curriculum, and will supplement classroom theory. **STEMEdu** includes innovative summer programming and supplemental educational classes during the summer months and school holiday breaks.

### **STEMTOURS:**

Tours designed to expose, inspire, and train students to study and pursue careers in STEM. All activities and inquiry-based outreach experiences are developed and tailored to recruit and retain students' interest in STEM related academic subjects and professional careers. SN accomplishes this by utilizing the infrastructure, organizations, and businesses within the student's own community.

### **STEMTV:**

Media program to bring STEM content into the homes and communities of New Orleans, especially urban homes where STEM role models are lacking. Media will be produced by school and community-based program, then aired continuously on educational access channels.

### **STEMTEACH:**

Professional development designed to train educators to incorporate relevant STEM activities into their classrooms and schools.



## A Typical STEM Saturday with Dr. Calvin Mackie

On May 10, 2014, the Joe Brown Recreation Center hosted STEM Saturday with Dr. Calvin Mackie, with the theme of rockets. Participants came from locations as far as Houston, Texas, and Atlanta, Georgia. The students were treated with an engaging and personal presentation from Dr. Jeanette J. Epps, a NASA astronaut. Students designed, built, and launched rockets made out of a variety of materials, including water, Alka-Seltzer, and air pumps. The hands-on rocketry activities demonstrated Newton's Three Laws of Motion, and helped the students make connections between STEM and everyday activities. The activities were aimed at teaching students the engineering design process and teamwork.

NASA astronaut Dr. Jeanette J. Epps was a special guest for the event. There were also 60 volunteers helping the students, many of them STEM professionals working with NASA or Boeing. The Boeing Company sponsored the event, and provided inflatable replicas of the Space Launch SySTEM (SLS), and the Orion capsule (NASA's next exploration spacecraft, designed to carry astronauts to destinations in deep space including Mars).



- Number of students registered: 214
- Number of male students: 128
- Number of female students: 86
- Number of different schools represented: 99
- Number of free/reduce lunch Orleans residents: 61
- Number of volunteers: 60





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## Calvin Mackie, PhD



Dr. Calvin Mackie is one of the nation's most prolific young STEM leaders. He is an award-winning mentor and internationally renowned motivational speaker with a message that continues to transcend race, gender, ethnicity, religion, and time. He devotes his passion and talent to helping others unleash their greatness and transcend personal and social barriers. Operating under the premise that exposure and experience are two important parameters of success, he utilizes unique strategies and methodologies to motivate and inspire. Calvin Mackie has lectured widely throughout the United States, helping people change the way they think about achieving their lifelong dreams through education and STEM.

He attended Morehouse College, earning his degree in mathematics, as well as joining the prestigious Phi Beta Kappa National Honor Society, and graduating Magna cum Laude. He was simultaneously awarded a Bachelors degree in Mechanical Engineering from Georgia Tech, where he subsequently earned his Master and PhD in Mechanical Engineering.

Mackie is currently a partner in Golden Leaf Energy (GLE) [www.GoldenLeafEnergy.com](http://www.GoldenLeafEnergy.com). GLE promotes and distributes the ethanol fuel blend E85, which is comprised of 85% ethanol and 15% regular gasoline. GLE also produces biodiesel from waste and yellow grease, and distributes to numerous commercial clients. In the near future, GLE will be producing ethanol from waste sugar and alcohol products. The company is reducing waste in landfills while providing clean biofuels for the nation. Presently, Golden Leaf Energy is the exclusive alternative fuel supplier for the federal fleet cars in the state of Louisiana.

Dr. Mackie co-founded Channel ZerO, an educational and motivational consulting company in 1992. Since then, he has presented to numerous civic and educational institutions, as well as Fortune 500 corporations. Over the last 16 years, Dr. Mackie has presented to numerous school districts, educators, universities and corporations across America. In 2004, Dr. Mackie received the **2003 Presidential Award for Excellence in Science, Mathematics and Engineering Mentoring** in a White House ceremony. In 2005, he was the featured speaker for the six regional forums for The College Board and the opening speaker for the 50th Anniversary of Advanced Placement (AP) Conference. Mackie has addressed the National School Board Association, National Society of Black Engineers (NSBE), American Society of Mechanical Engineers (ASME), National Science Foundation (NSF) and is a frequent speaker at national teacher trainings, school districts, mentoring and technical development conferences. Most recently, Mackie has been lecturing internationally in Kuwait and Canada

Dr. Mackie is the author of two books:

*Grandma's Hands: Cherished Moments of Faith and Wisdom*, and  
*A View from the Roof: Lessons for Life and Business*

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## State of Emergency: the Ominous US Crisis in Science, Technology, Engineering, and Mathematics (STEM) Education and Training

By Calvin Mackie, PhD. *Teachers of Color*, Fall 2008

Simply, in the 21st century, one of America's greatest challenges will be educating and training a technical workforce to ensure that we can compete and thrive globally. If we are to compete on the global stage in a ever expanding global economy where Science, Technology, Engineering and Mathematics (STEM) are the new intellectual and innovative currencies, we must motivate, inspire and train an entire generation of Americans to become STEM literate in general, and to pursue STEM careers specifically. We must motivate, inspire, recruit, retain and graduate more American teachers at every level in STEM related academic subjects to produce the workforce of the knowledge and green economy.

As the knowledge economy grows, it is important that we produce more scientists and engineers, invest in research and development infrastructure and increase all American students' understanding of science, technology engineering and mathematics (STEM). If we do not do such things, we threaten our economic welfare as well as the security of the country. For more than half a century, the United States has led the world in scientific discovery and innovation and now that leadership is being challenged by factors at home and abroad. Foreign advances are challenging the United States leadership in innovation and STEM education. The US has been a beacon, drawing the best scientists to its educational institutions, industries and laboratories from around the globe. American educational institutions have always had the advantage of skimming the cream of the crop from nations like China, India and Japan bringing the best minds in the world to study and eventually work in the U.S. However, in today's

rapidly evolving competitive world, the U.S. can no longer take its supremacy for granted. Nations from Europe to Eastern Asia are on a fast track to pass the United States in scientific excellence and technological innovation. (The Task Force on The Future of American Innovation: Innovation is America's Heartbeat)

The catastrophic events of 9/11, Hurricane Katrina and the collapse of Interstate I-45 in Minnesota demonstrate that we have to educate, develop and train more US born scientists and engineers. As such, many politicians, educators and business leaders are truly concerned about the country's ability to compete in the future. President Bush in his 2005 State of the Union address called for a \$136 billion boost in science and education research over the next 10 years. President Bush stated, "We cannot afford to be complacent. In a dynamic world economy, we are seeing new competitors, like China and India." Why are President Bush and other leaders concerned? Consider the following:

In 2005, China graduated 500,000 engineers, India, 200,000 and North America, 70,000. (National Academy of Science Report: Rising Above the Gathering Storm)

The Bureau of Labor Statistics estimates that science and technology jobs will increase by 26 percent, compared to 15 percent for all occupations, from 2002 to 2012. Computer science and mathematics alone are projected to increase by 39 percent.

According to the National Science Foundation (NSF), more than half of the US PhD degrees awarded in physics, engineering, mathematics and



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computer science are awarded to non US citizens. In 2004 alone, 46 percent of master's degrees and 57 percent of doctoral degrees were awarded to foreign nationals.

In the US in 2005, less than 5 percent of all undergraduate degrees were awarded to engineers, compared to 8 percent in 1985. The production of engineering degrees by women, African-Americans and Hispanics are declining or flat line at best. (American Society of Engineering Education (ASEE), PRISM Magazine, October 2006, pages 27-31)

According to the National Science Board, the number of 18-24 year olds in the US who receive science degrees has fallen to 17th in the world, whereas it ranked third three decades ago.

According to the NSF, the percentage of scientific papers written by Americans has fallen 10 % since 1992.

The percentage of American papers published in the top physics journal *Physical review* has fallen from 61% to 29% since 1983. (NY Times 5/3/04 William Broad, "US is Losing Its Dominance in the Sciences")

By the year 2050, members of underrepresented minority groups will constitute half of the U.S. college-age population. Such groups share lower rates of high school completion, college attendance, and college completion in comparison to non-Hispanic whites and Asian Americans. (NACME – National Action Council for Minorities in Engineering – "Confronting the "New" American Dilemma")

The disparity in the representation of minorities, as well as women, is becoming an increasing problem for the STEM disciplines given the demographic changes occurring in society. African Americans,

American Indians, and Latinos constitute 30% of the nation's undergraduate students, a proportion that is expected to grow to 32% in 2010 and 38% by 2025. Latinos will account for 90% of the growth; they will constitute one-sixth of the nation's population by 2011. Yet, today, fewer than 12% of baccalaureate engineering graduates in this country are underrepresented minorities. (NACME – New Dilemma)

To remain competitive, there are great challenges and factors to overcome. Those factors include but are not limited to a shortage of scientific mentors, parental pressure on kids to seek more lucrative careers, discrimination against science-bound women and minorities, the prevailing nerd image of scientists and engineers, the lack of science and math preparation for K-12 teachers and the country's unhealthy and overzealous focus on celebrity and fame. As Thomas L. Friedman noted in his best sellers, "The World is Flat:", "In China, Bill Gates is a star, a celebrity, students would hang from rafters to get a glimpse of or hear a speech from Bill Gates. In China, Bill Gates is Britney Spears, and in America, Britney Spears, well, is Britney Spears."

We have to do a better job of informing and preparing our children of the future and what will be needed from them to succeed and thrive in a global community. For example, in 2005, the Raytheon Corporation surveyed 1,000 11 to 13 year olds and discovered that 84% stated that they would rather "clean their room, eat vegetables, go to the dentist or take out the garbage than learn math or science." In essence, 84 percent of the kids have no interest in preparing themselves to participate in the knowledge global economy. Recently Craig Barrett, the former CEO of Intel, noted that Intel sponsors an international science competition every year and in 2004, it attracted some 50,000 American high school kids.





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“I was in China 10 days ago,” Mr. Barrett said, “and I asked them how many kids in China participated in the local science fairs that feed into the national fair [and ultimately the Intel finals]. They told me six million kids (The World is Flat:, Thomas L. Friedman). Our students and their parents must realize that they are now competing against the World and other nations are doing a better job of preparing their children for a stable future based on a technological economy.

To remain competitive, the US must train and develop an emerging US talent pool that looks very different from years and decades past. Women and minorities are the fastest growing populations in the US and efforts must be made to include these populations in STEM areas. However, we are failing as according to NACME, only 4% of underrepresented minorities graduate high school “engineering eligible.” For example, in 2002, 690,000 minority students graduated from high school, but only about 28,000 had taken the necessary math and science courses to be fully qualified for admission to engineering study. Approximately 17,000 of them enrolled as first-year students in engineering schools out of a total class of 107,000. That same year, 4,136 Latinos, 2,982 African Americans, and 308 American Indians received baccalaureate degrees in engineering out of a total of 60,639 minority graduates, according to data from the Commission on Professionals in Science and Technology (CPST). Therefore, we need more trained and certified STEM teachers in K-12 who can serve as role models and mentors for women and minority students in the STEM pipeline.

Teachers and Counselors are the gateway to the 21st Century for our students. If the teachers are not pre-

pared or trained in their respective STEM field, if counselors are unaware or don't believe STEM is for all students and if the students are not challenged with rigor and high expectations, the students as well as the viability of this country are doomed. Teachers, from preschool through graduate schools must infuse STEM throughout their curriculum including active, hands-on, project-based real world experiential learning. The country cannot move forward leaving most of her people behind. If the country, her leaders and teachers fail to prepare and equip citizens from all population groups to participate and succeed in the present and future knowledge and technology driven economy, we risk undermining our own demise on the world stage, economically and intellectually.





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## My View: Education is Useless Unless You're Motivated

By Calvin Mackie, PhD. *CNN: Schools of Thought*, September 2012

As a mechanical engineer with a Ph.D., a motivational STEM speaker and a former college professor, you'd probably be surprised to hear that I think education is useless.

In America, the education system has moved away from developing citizens to serve their fellow man to the unadulterated pursuit of standardized success at any cost. Mixed in with a sea of social change and celebrity obsession, somehow we've all lost sight of the goal of education: creating passionate students who are employable, teachable and adaptable in a dynamic world. Students are turned off for a number of reasons right now.

To get back on track, we must recognize that education is useless if students aren't thirsty for it!

I'll always remember this lesson that my grandma and grandpa taught me when I was a young kid. I was trying to force a pig to eat the slop I had prepared for him, when my uneducated but wise grandmother stated the truism, "Baby, you can lead a horse to water, but you can't make him drink!"

Much like the pig, today's students don't want the education we have prepared. They either aren't hungry or they've gotten their fill from somewhere else. In response to my grandma, my grandpa yelled back, "Yeah, you can't make him drink, but you sure can get him thirsty!"

We can bring students their education and put it on a silver platter right in front of them, but if they don't want it, they're not going to eat it. How can we make

our students crave it? How can we get them motivated and passionate about learning again? The key is to get back to basics and remember what education is really about.

The primary purpose of education isn't to teach students how to make money but to provide them with the tools and mechanisms so that they can be FREE. Free to create, free to produce and free to do the things God has ordained and created them to do. As W.E.B. Du Bois stated, "The purpose of education is not to make men and women into doctors, lawyers, and engineers; the purpose of education is to make doctors, lawyers, and engineers into men and women."

Education affords people the ability to develop and expand their personal and collective capacities. It not only gives them skills, it helps increase their sense of "somebodiness" and purpose. Only when we bring purpose and service back to education, coupled with utility and training, will we win back the hearts and souls of America's students.

Now, it's not going to be that easy. "The Silent Epidemic," a 2006 study funded by the Bill and Melinda Gates Foundation, found that annually, nearly one-third of all public high school students fail to graduate with their class. Nearly one-half of all blacks, Hispanics and Native Americans are flunking out too. In simple terms, the present-day education system is failing the very people it's supposed to serve: the students.

One of the biggest issues is that our children are





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growing up in a culture where their passions are advertised and sold to them - there's no room for them to grow on their own terms. They are more motivated to become the next American Idol, contestant on "Dancing With the Stars" or hip-hop mogul than to become leaders of the free world or create the next Internet. What else can explain the fact that President Barack Obama and Kim Kardashian have the same number of Twitter followers?

What we need to understand is that students have motivation right now, they are just motivated by the wrong things, superficial things that do not require nor promote the education needed to succeed in the 21st century and only make them "feel good." And so education is rendered useless. As teachers, parents, motivators and concerned citizens, we must shift our strategy to combat this problem and make our students thirsty!

Rather than starting with lesson plans that attempt to go right to the brain, teachers need to grab student's attention and win their hearts first.

Show them the amazing lifestyle they can earn by becoming a contributing member of the knowledge economy. Put new role models in front of them - people they should look up to, follow on Twitter and "like" on Facebook.

Help them develop the ability to achieve whatever career they want, whether that is as a doctor, lawyer, engineer or teacher. Remind them every day that when you, "put something in your head, no one can take that from you."

In the end, it's up to us to reignite and resuscitate America's students. Service and self-agency are the essence of motivation in education. When they return, so will our students.





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## Rediscovering your Passion for Teaching

By Calvin Mackie, PhD. Association of American Educators Foundation: *Education Matters*, November 2008

If I have heard it once from educators, I have heard it a thousand times: My students are not motivated, they are not inspired. Well, I say this:

*Many teachers and other educators are neither motivated, inspired, nor prepared to accept and deal with the daunting challenges facing us today.*

Education is not for the faint at heart nor the easily discouraged. However, I ask anyone to walk the halls of any public K-12 system and observe the behavior of the teachers or look deep within their eyes, and tell me what you see? When I do it, I do not see the fire, the will, or the hope necessary to grab a life in the critical moment of development and send it on a trajectory of personal growth and development and professional success.

I was taught that he who controls the diameter of your learning controls the circumference of your actions. A teacher is charged with motivating and inspiring students to go further than ever imagined. As such, as a teacher, if I do not want my students to go anywhere, all I have to do is not teach them anything. We know we have succeeded when the prodigal student returns and begins to teach us things we do not know. To teach, one must be passionate, motivated, and inspired—full of life. However, many teachers die soon after entering the system, showing up routinely everyday as part of the walking, breathing, living dead, with no hope, inspiration, or motivation. The poet William Butler Yeats stated, “Education is not the filling of the pail but the lighting of a fire.” Famous boxing promoter Don King, when asked what is success, replied, “Set yourself on fire and

people will show up to watch you burn.” Maybe our students are not on fire because we, the educators, are not on fire. Many of us have become fire fighters, pouring water on the fire of our children’s hopes and dreams, rather being the fire lighter, and igniting them every day to go beyond their limited view. Be honest, which are you: fire fighter or fire lighter?

I am convinced that graveyards hold much of the community’s rich potential. So many people go to their graves with their dreams, hopes, and true maximum potential never tapped or reached. It is a shame when you are buried at seventy years old, but you died at twenty-five. Many teachers enter the profession at twenty-two years old and within three years, have allowed their fire to be wiped out by a deluge of societal problems which every day affects the minds of our children and the learning process. Martin Luther King, Jr., stated in a 1963 Detroit speech, “If a man hasn’t discovered something he will die for, he isn’t fit to live.” For educators, it is our children and students for whom we must be willing to die. I am convinced that many of us became educators because we believed that one day we were going to transform lives and change the world. However, many of us have allowed the enormity of the challenge, the growing bureaucracy, and the unfair public criticism to steal our fire, our dreams, and our passion. Many of us have allowed our dreams to die too soon.

Educators, we need to decide to live again, as our children depend on us. An old man taught me that a dead fish can go with the flow, but it takes a mighty strong and alive one to go against it. Many of us have





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blamed the children for things they cannot control. Many of the kids arrive at our doors unprepared, undisciplined, and clueless about why they are there. However, we cannot blame them because clay does not decide what it will become; we, teachers and educators, mold clay. Many educators, especially those occupying positions in institutions of higher education, are becoming like doctors in hospitals who do not want to treat sick patients. They only desire and admit the healthy, well-prepared and equipped students who they can nurture and graduate. Then, they spend a lifetime bragging about how their great, healthy, and well students never became ill.

Many educators need to do three things to rekindle their fire and live again:

### **1. Rediscover your passion.**

If children, teaching, and/or education are not your passion, then please quit the profession. You, the school, your colleagues, and especially the students will be better for it. James Baldwin said, "A passion is not friendly. It is arrogant, superbly contemptuous of all what is not itself, and, as the very definition of passion implies the impulse to freedom; it has a mighty intimidating power. It contains a challenge. It contains an unspeakable hope." As educators, your passion is the fire that will ignite you to challenge the status quo and bring out the hope in our children.

### **2. Become unreasonable.**

Refuse to accept things as they are; push and work for the way things ought to be. We have begun to rationalize the failure in ourselves, our leaders, and our students. Create high expectations for yourself and become the example for your colleagues. George Bernard Shaw said, "The reasonable man adapts himself to the world; the unreasonable one persists

in trying to adapt the world to himself. Therefore all progress depends on the unreasonable man." It has always been the unreasonable teacher who gets the most out of students. The educator who is loathed and cursed is usually the one which is respected and loved in retrospect by the students.

### **3. Take Pride in your profession.**

It is time for teachers to stand up for their profession and claim their role as contributors to society. Teachers, if they came together, could teach an insurrection. However, as long as teachers are maligned and not respected, first and foremost, by themselves, their true power and abilities will never manifest. Teachers must police teachers and root out those who are disrespecting and damaging the profession. It is a shame that we need to debate dress codes for teachers. If we want to be treated as professionals, we must behave and carry ourselves as professionals. As teachers, we must understand that we can be among the most important 'real role models' for children...

*Long Live Educators!*





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